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Alan G. Ahearne, William L. Griever, and Francis E. Warnock

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Abstract: Using a comprehensive new data set, we exploit the cross-sectional variation of U.S. holdings of equities in a wide range of countries to gain insight into the equity home bias phenomenon. We find that a direct barrier to international investment—restrictions on foreign ownership of equities—significantly affects the country distribution of U.S. equity holdings, but has only a small effect on the overall level of home bias. More important are information asymmetries due to the poor quality and low credibility of financial information in many countries. While no direct measure of information costs is available, some foreign firms have reduced these costs by publicly listing their securities in the United States, where investor protection regulations elicit standardized, credible financial information. We find that a proxy for the reduction in information asymmetries—the portion of a country's market that has a public U.S. listing—is a major determinant of a country's weight in U.S. investors' portfolios. Foreign countries whose firms do not alleviate information costs by opting into the U.S. regulatory environment are more severely underweighted in U.S. equity portfolios.

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I. Introduction

The international version of the classical capital asset pricing model (ICAPM), based on traditional portfolio theory developed by Sharpe (1964) and Linter (1965), predicts that to maximize risk-adjusted returns investors should hold the world market portfolio of risky assets, irrespective of their country of residence. In practice, however, the proportion of foreign assets in investors' portfolios tends to be very small. In the case of equities, foreign stocks make up a disproportionately small share of investors' equity holdings when one considers relative stock market capitalizations. The phenomenon whereby individuals hold too little of their wealth in foreign assets relative to the predictions of standard portfolio theory, commonly referred to as the home bias puzzle, is discussed by among others French and Poterba (1991), Cooper and Kaplanis (1994), and Tesar and Werner (1995).

The so-called home bias puzzle can be addressed using either holdings or returns data. Estimates of cross-border positions are generally of poor quality, hampering the analysis of home bias and forcing researchers to use highly specialized data sets to investigate foreigners' investments in the equities of specific countries such as Japan, Finland, and Sweden.[1] We, too, use a specialized data set, but instead of looking at, say, foreigners' holdings of Swedish stocks, we analyze home bias using data on the international holdings of U.S. investors—the largest group of international investors in the world.

As noted, the home bias issue can also be addressed using returns data. For example, Lewis (1999) provides evidence of large gains from international portfolio diversification. However, Errunza, Hogan, and Hung (1999) show that a portfolio of well-diversified U.S. stocks goes a long way towards mimicking foreign markets, calling into question whether a home bias actually exists. Whether or not "biased" is an apt descriptor of U.S. equity holdings, an examination of the relative importance of the holdings of U.S. investors' across a wide range countries is a useful endeavor. Why are U.S. investors' holdings of Argentinian stocks almost three times their holdings of Chilean stocks, even though the two markets are of comparable sizes? Similarly, given that Germany's stock market is almost twice as large as the Netherlands', why are U.S. holdings of Dutch stocks so much greater?

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[1] See Kang and Stulz (1997), Dahlquist and Robertsson (2001), and Grinblatt and Keloharju (forthcoming).

The answers to these questions may well aid in our understanding of why foreign stocks have a relatively small weight in the U.S. equity portfolio. As shown in Figure 1(a), foreign equities are now about 12 percent of U.S. investors' equity portfolios, a substantial increase from their one percent share two decades ago, but far smaller than their relative size in world market capitalization. Figure 1(b) condenses this information into a measure of equity home bias, defined as one minus the ratio of the share of foreign equities in the U.S. and world portfolios. As the graph shows, the home bias in U.S. equity portfolios has decreased substantially over the past two decades, but remains quite high.

To better understand home bias, we exploit the cross-sectional variation of U.S. holdings in a wide range of countries. In particular, we examine the roles of direct and indirect barriers to cross-border investment on the country distribution of U.S. investors' foreign equity portfolios. We have actual measures of direct barriers, and find that one—the intensity of capital controls— has a statistically significant impact on the distribution of U.S. holdings. More importantly, we find that the major determinant of countries' under- or overweighting in U.S. portfolios is a proxy for the extent to which their firms' have reduced information asymmetries, the portion of the foreign market that is publicly listed in the United States.

When firms issue public debt in the United States ("Yankee bonds") or list on U.S. exchanges, barriers to U.S. investors are reduced. There is some reduction in direct barriers, as such securities have increased investor recognition and U.S.-listed equities have lower transaction costs, better settlement, and may well find their way into domestic mutual funds. More important, though, is the fact that these firms have opted into the U.S. environment of investor protection regulations—its accounting standards, disclosure requirements, and regulatory environment—and in doing so are compelled to produce higher quality financial information. The higher quality information can be interpreted as a reduction in information costs that makes the firm more attractive to U.S. investors. Hence, the larger the share of a country's firms that publicly lists securities in the United States, the larger is its relative weight in the U.S. equity portfolio, and the less is U.S. investors' bias against its stocks. Our findings suggest that if all foreign firms list publicly in the United States, the home bias presented in Figure 1(b) would fall from about 0.8 to 0.5. Home bias would be greatly reduced, but would still exist.

The remainder of the paper is organized as follows. The next section describes in greater detail our data set on U.S. investors' holdings of foreign equities. Section III presents an illustrative model of the effects of barriers to cross-border investment. Section IV discusses measures of direct barriers to international investment. Section V discusses how public U.S. listings can alleviate information costs incurred by U.S. investors. The main results of statistical analysis on U.S. investors' holdings of foreign equities are presented in Section VI. Section VII presents further regression results and Section VIII concludes.

II. Data[2]

A major hindrance in research on home bias using holdings data has been the poor quality of cross-border holdings estimates. In the past, holdings were estimated using accumulated capital flows and valuation adjustments; see, for example, French and Poterba (1991), Tesar and Werner (1995), Cooper and Kaplanis (1994), and Bekaert and Harvey (2000b). Warnock and Mason (2001) show, however, that estimates of country-level holdings from flow data can be wildly off the mark, likely due to some combination of inadequacies in the flow data and inappropriate valuation adjustments. Country-level valuation adjustments can be incorrect if calculated using a market index when U.S. investors hold a portfolio that differs significantly from the market. The flow data can be inadequate for estimating holdings because they are collected based on the country of the transactor, not the country of the security. When the countries of the transactor and security differ—as is often the case with trades through financial centers such as the United Kingdom and Hong Kong—the country distribution of the transactions data is distorted.

Recently, the United States has conducted two comprehensive surveys of U.S. residents' holdings of foreign securities, one as of March 1994 and another as of December 1997.[3] By gathering security-level data from the major custodians and large end-investors, these surveys provide higher

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[2] Details on data and sources are provided in Data Appendix A.

[3] The only other such survey was conducted in 1943.

quality holdings data.[4] Reporting to the surveys was mandatory, with penalties for noncompliance, and the data received were subjected to extensive analysis and editing before they were accepted as accurate. Importantly, the country attribution of each security was determined using both commercial and respondent data, correcting a major shortcoming of the capital flows data.[5]

A sense of the significance of these surveys can be gained from Figures 2(a) and 2(b). Figure 2(a) shows the current official estimate of the dollar value of foreign equities held by U.S. residents, along with official estimates prior to receiving data from the 1994 and 1997 surveys. The more accurate information from those surveys raised the holdings estimates by $263 billion in 1994 and $200 billion in 1997. The bottom panel shows, for December 1995, the ratio of estimates from Bekaert and Harvey (2000b) to estimates from Warnock and Mason (2001). Both sets of estimates use cumulated flows and valuation adjustments; the only difference is that the latter uses information from the 1994 benchmark. For some countries, such as Argentina, the ratio is near one, indicating that the estimates are nearly identical. For others, though, such as Venezuela (at 0.004) and the Philippines (at 2.8), there is great disparity.

While estimating holdings was not the objective of the Bekaert and Harvey (2000b), Figure 2(b) highlights that holdings estimates can vary greatly. Since the benchmark survey data provide the best measures of U.S. holdings of foreign equities, we limit our study of home bias to the dates of the surveys, March 1994 and December 1997. Specifically, for these two dates we form a variable that measures the degree of bias of U.S. investors across a wide range of countries, similar to the variable for U.S. investors' foreign portfolios that was presented in Figure 1(b). For those uncomfortable with the term bias, the cross-country variation in our bias variable is due entirely to variations of the relative

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[4] Smaller custodians and smaller institutional investors were sampled, but 99 percent of the data was from the major reporters. Holdings of U.S. private investors were included to the extent they were through U.S. mutual funds or are entrusted to U.S.-resident custodians for safekeeping.

[5] Further details of the 1997 survey, including findings and methodology, are discussed in Treasury Department and Federal Reserve Board (2000).

importance of U.S. holdings across markets, or U.S. holdings scaled by market capitalization.[6] By better understanding this cross-country variation, we hope to gain insight into the home bias puzzle.

Table 1 presents the components of the bias variable for the 48 countries in our sample as of one of our sample dates, December 1997.[7] Column 1 of the table shows the strong preference by U.S. investors for domestic equities over foreign equities—almost 90 percent of the U.S. equity portfolio consists of U.S. stocks. For foreign equities, the United Kingdom was the country of choice for U.S. investors, with U.K. stocks comprising almost 2 percent of the U.S. equity portfolio, followed by Japan, the Netherlands, France and Canada. U.S. holdings of foreign equities are quite concentrated, with the top 15 countries accounting for almost four-fifths of total U.S. holdings of foreign equities.

The second column in Table 1 presents the share of each country in the world portfolio, which corresponds to the share predicted by standard portfolio theory. That is, it shows the shares of U.S. equity holdings by country in a hypothetical world in which global capital markets were complete and investors in all countries had identical preferences and chose portfolios optimally based on standard portfolio theory.

Comparing the shares of each country in the U.S. and world portfolios gives an indication of the degree to which U.S. investors underweight different foreign countries. As expected, for all countries other than the United States, U.S. holdings are less than those predicted by ICAPM. The extent of the underweighting is shown in column 3, which presents each country's weight in the U.S. portfolio relative to its weight in the world portfolio. If the size of the foreign market was the only determinant of the country distribution of U.S. holdings, this measure would not vary across countries. Interestingly, though, there is a significant amount of variation in values across countries. For example, the relative weight in U.S. portfolios for both the Netherlands and Mexico is roughly 0.44, indicating that U.S. investors' holdings of stocks from these countries at end-1997 were 44 percent of what traditional

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[6] Our bias measure is equivalent to normalizing U.S. holdings in a country by the country's market capitalization and then dividing by a constant (the share of overall U.S. holdings in the worldwide market capitalization).

[7] Data for the other sample date, March 1994, are available from the authors.

portfolio theory would have predicted. On the other hand, the degree of underweighting appears more severe against countries such as Japan and Germany, where U.S. investors hold 12 and 15 percent, respectively, of the ICAPM levels.

Our measure of U.S. investors' home bias against each country, shown in column 4, is defined as one minus the relative weight in the U.S. portfolio, or one minus the ratio of the share in U.S. to world portfolios. Hence, a greater value of this measure corresponds to a lower weight in U.S. relative to world portfolios and, thus, a higher degree of bias. In our sample, the bias measure varies from 0.98 for China, where our holdings are 2 percent of the benchmark, to 0.44 for Ireland, where our holdings are 56 percent of the benchmark. As we have noted, the main goal of this paper is to explain the distribution of this measure of U.S. investors' home bias across countries.

III. Costs to Cross-Border Investment and Home Bias: A Model

The ICAPM prediction that individuals hold equities from around the world in proportion to market capitalizations is based on the assumption that there are no barriers to international investment. In practice, although many have fallen substantially over the past few decades, barriers do exist and may influence the observed home bias.

Some of the costs associated with investing abroad are explicit, such as transaction fees, taxes, commissions, and the costs of gathering information. In addition, investors face implicit costs, including costs that arise from informational disadvantages vis-a-vis local residents. Both types of costs serve to lower expected net returns on foreign investment. For example, investors who are considering which stocks to purchase in a particular foreign country will want to differentiate between firms in that country with good profit prospects and those whose prospects are poor. To the extent that lax disclosure requirements—or lax enforcement of disclosure requirements—makes such differentiation difficult, these investors may end up holding more foreign "lemons" than local insiders who have better information.

To fix ideas, we present a model of international portfolio allocation drawn from Cooper and Kaplanis (1986). The model includes country-specific proportional investment costs, representing both

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explicit and implicit costs of investing abroad.[8] That standard direct costs are proportional should not be controversial. Information costs can also be thought of as a proportional cost because it is not sufficient to merely learn the accounting standards of the foreign country, which would be a fixed cost. Given differences in disclosure requirements and regulatory environments, in many countries the true picture of earnings is available only to insiders. While one could argue that the cost of becoming an insider is fixed at the firm level, the number of firms is not fixed, so such costs could still be represented by a proportional cost at the country level.[9]

Under standard ICAPM assumptions, the ith investor's optimization problem is to choose x_i, the allocation of her wealth among risky securities in n countries, to maximize expected returns net of costs, or:

$$\max \ (x_i' R \ \& \ x_i' c_i)$$

subject to

$$x_i' V x_i \ ' \ v$$
$$x_i' I \ ' \ 1$$

where

  x_i is a column vector, the nth element of which, x_{in}, is the proportion of individual i's wealth invested in securities in country n

  R is a column vector of pre-cost expected returns

  c_i is a column vector, the nth element of which, c_{in}, is the cost to investor i of holding securities in country n

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[8] Seminal papers modeling the effects of barriers to international investment are Black (1974) and Stulz (1981).

[9] Many researchers contend that proportional costs are not likely to inhibit cross-border investment because Tesar and Werner (1995) showed that turnover rates on foreign portfolios are extremely high. However, Warnock (2001) shows that this result was based on published data that grossly underestimated cross-border holdings.

v is a constant

V is the variance/covariance matrix of the gross (pre-cost) returns of the securities

I is a unity column vector

W_i is the proportion of world wealth owned by country i

M is a column vector, the ith element of which, M_i, is the proportion of world market

           capitalization in country i's market

For simplicity, assume that the covariance matrix, V, is diagonal with all variances equal to s^2. Imposing the world capital market clearing condition, $\sum W_i x_i = M$, the solution to this problem simplifies to

$$h s^2 (x_{in} - M_n) = -c_{in} + b_n + a_i - d \tag{1}$$

where

$a_i = z'c_i$ (weighted average marginal cost for investor i)

$b_n = \sum M_j c_{jn}$ (world weighted average cost in country n)

$d = z' \sum M_i c_i$ (world weighted average cost)

$z = V^{-1}I / (I'V^{-1}I)$ (global minimum variance portfolio)

and h is the Lagrange multiplier on the constraint $x_i' V x_i = v$.

In the case with no costs to investing, c_i is a zero vector and the right-hand side of (1) is zero. Hence $x_{in} = M_n$; that is, investor i allocates his wealth across countries according to market capitalizations.

In the more general case with non-zero and non-uniform costs, if the actual cost to investor i of investing in country n (c_{in}) is high relative to investor i's average cost to investing (a_i) or relative to all investors' costs to investing in country n (b_n), then the right-hand side of (1) is likely negative and investor i will underweight country n in his portfolio. The higher are costs in a particular foreign market, the more severely underweighted that country will be in the investor's portfolios. Moreover, since

investors do not face such costs in their home market, equation (1) predicts an overweighting of domestic stocks—the equity home bias—when costs exist in other countries. In the next two sections we discuss measures of direct and indirect barriers to international investment that may influence the home bias in equity holdings.

IV. Measures of Direct Barriers to International Investment

Direct barriers to international investment include capital controls, on the part of both the source and destination countries; explicit transaction costs such as fees and commissions; implicit transaction costs such as those stemming from illiquidity; settlement costs; and the costs of gathering information.

Capital Controls

Although capital controls have been greatly reduced in many countries, they can still affect cross-border investment. It is probably not a coincidence that some of the countries U.S. investors underweight most (for example, China) maintain substantial barriers to foreign investment. Further evidence that capital controls affect cross-border investment is given by the time line in Bekaert and Harvey (2000a), which indicates that in early 1997 foreign ownership limits for two of the largest Korean stocks, Korea Electric Power and Pohang Iron and Steel, were repeatedly binding, relaxed, and binding again.

Empirical work on the effects of capital controls on portfolios has been hampered because no widely accepted cross-country measure of the *intensity* of capital controls currently exists. There are many measures of capital controls in the literature, but most are dummy variables based on restrictions reported in the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions*; see the excellent survey of Eichengreen (2000).[10] Bekaert and Harvey have in a number of papers dated liberalizations for a range of emerging market countries—see, for example, Bekaert and Harvey (2000b)—but provide no measure of the intensity of controls.

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[10] Quinn (1997) takes this approach one step further by coding the dummy variables on a two-point scale to provide some information on the intensity of controls.

In this paper we use the measure of the intensity of foreign ownership restrictions developed in Edison and Warnock (2001). The measure, constructed using data from the International Finance Corporation's (IFC) emerging market indexes, is one minus the ratio of the market capitalizations of a country's IFC Investable and Global indices. The Investable index is comprised of all stocks in the Global index that are deemed by the IFC to be available to foreign investors, where availability is determined by both legal restrictions but also liquidity. If, for example, a stock is closely held and in effect not traded, it would enter the IFCG index with full weight but would have a weight closer to zero in the IFCI. When there are no restrictions, the market capitalizations of the two indexes are equal and the measure equals zero.

Figure 3(a) shows the time series version of this measure for Korea. Prior to 1992, Korea was closed to foreign investment. The first decrease in foreign ownership restrictions was in January 1992, which corresponds with the Bekaert and Harvey (2000b) liberalization date. The incremental reductions of the mid-1990s are also clearly shown in the figure, as are the sharp reductions during the East Asian crisis.

Figure 3(b) shows the cross-sectional variation of this measure as of end-1997. Restrictions vary greatly across developing countries, with about 90 percent of China's market unavailable to foreigners in 1997, compared to only 2 percent of South Africa's.[11]

Regulations on U.S. Institutions

Home bias may be due to regulations on U.S. institutions' foreign investments. For example, Tesar and Werner (1995) note that U.S. insurance companies are by state law limited to holding a maximum of 3 percent of their assets overseas, while U.S. pension funds are subject to "prudent man" laws.

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[11] The IFC does not publish Investable indexes for industrial countries. Absent other information, we assume that for these countries the Investable and Global indexes are identical and, therefore, that foreign ownership restrictions are zero in industrial countries.

At first glance, the 3 percent foreign limit for U.S. insurance companies appears to be a plausible contributor to the home bias in U.S. equity holidngs. But the limit, which varies by state, is as a share of total assets, not just of equity holdings. Life insurance companies tend to hold very little of their assets as equities. According to the National Association of Insurance Commissioners (NAIC), in 1994 equities comprised only 5 percent of their $1.6 trillion in total assets (Barth, 1995). Given that in New York, for example, the limits for life insurance companies are 20 percent for equities and 5 percent for foreign securities, while Connecticut has a 25 percent equity limit but does not address foreign investments, it is not likely that the limits on equities or foreign investment are binding.[12,13]

U.S. pension funds have guidelines or legal limits on foreign investments, depending on the state, but some of the largest funds exhibit surprisingly little home bias. For example, the current target for the California Public Employees' Retirement System (CalPERS) states that 30 percent of the funds equity holdings, or 19 percent of total assets, should be in foreign equities.[14] The New York State Common Retirement Fund has as a legal limit of 10 percent of assets for foreign equities, but uses its basket bill to maintain a international equity target of 15 percent of assets, or 27 percent of their equity holdings. Since two of the largest pension funds have relatively high weightings on foreign equities, it is not likely that legal limits on pension funds are a significant cause of the home bias.

High Transaction Costs

Another possible cause of home bias is high transaction costs associated with trading foreign equities. Elkins-McSherry Co. provides data on transaction costs across 41 foreign markets; see Willoughby (1997) and Domowitz, Glen, and Madhaven (2000) for analyses of these data. The Elkins-McSherry measure is comprised of three components: commissions, fees, and market impact

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[12] Source: NAIC Chart CF-50, "Limitations on Insurers' Investments".

[13] Property-casuality insurance companies, about half the size of life insurance companies, hold a greater share of their assets as equities (nearly 19 percent), but large portion of those equity holdings are in parents, subsidiaries, and affiliates (Barth, 1995).

[14] Source: http://www.calpers.ca.gov/invest/asset/asset.htm

costs. Market impact costs, or liquidity costs, are intended to measure the deviation of the transaction price from the price that would have prevailed had the trade not occurred; see Willoughby (1998) for a discussion. In 1997, total costs ranged from a low of 20 basis points (bp) on the Paris Bourse to 220bp on the Korean Stock Exchange. While transaction costs have been (perhaps erroneously) dismissed by the literature as a plausible cause of home bias -- see Tesar and Werner (1995) and Warnock (2001) -- this can be tested now that data exist across a wide range of countries.

Other Direct Costs

Settlement costs can be higher when investing abroad. A global custodian must be utilized, and there is a greater probability of failed trades. The Bank of New York asserts that such costs can be 10 to 40bp higher abroad than in the United States. Finally, costs of gathering basic information could well inhibit international investment, although such costs have likely plummeted in the Internet Age.

V. Indirect Barriers and the Role of Public U.S. Listings

One type of indirect barrier that has received considerable attention recently is information costs. A number of recent empirical studies provide indirect evidence that information costs affect the composition of investors' portfolios. For example, there is evidence that foreign equity portfolios are skewed towards the equities of large firms, for which more information is readily available; see Kang and Stulz (1997) for evidence on foreign holdings of Japanese securities and Treasury Department (1998) for evidence on foreign holdings of U.S. securities. Portes and Rey (1999) provide evidence that information flows are an important determinant of cross-border equity transactions. Even within countries, there is evidence that investors tend to hold stocks of local companies, about which they presumably have more information. For example, Coval and Moskowitz (1999) show that U.S. investment managers exhibit a strong preference for locally-headquartered firms. Each of these studies suggests that asymmetric information between local and non-local investors may be an important factor for investment decisions.

12

Information asymmetries can arise from differences in accounting standards, disclosure requirements, and regulatory environments across countries. When investors contemplate purchasing equity in a foreign company, they must glean from published accounts information that is based on accounting principles and disclosure requirements that may differ greatly from those in their home country. Moreover, the credibility of this information is determined to a large extent by the regulatory environment, which also varies considerably from country to country.[15] Cross-country differences in accounting principles, disclosure requirements, and regulatory environments--which together can be thought of as investor protection regulations--give rise to information costs that must be borne by foreign investors. Information costs associated with investing in some countries may be significantly higher than in others.

Direct Measures of Information Asymmetries

As we noted in the previous section, measures of direct barriers to cross-border investment are available for many countries. Information asymmetries arising from differences in investor protection regulations, however, are not measurable. None of the necessary components -- meaningful numeric scores of accounting standards, disclosure requirements, and regulatory environments -- are readily available across a wide range of countries.

Accounting standards for about 40 countries, used in La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998), are available from the Center for International Financial Analysis and Research, but they are somewhat outdated. Even so, any numeric scoring of accounting standards across countries is likely inadequate for our purposes. For example, these measures do not include information on disclosure requirements and are calculated based on the inclusion or omission of certain items, but these

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[15] Bordo, Eichengreen, and Irwin (1999) note that the U.S. railroad industry received a disproportionately large share of portfolio investment flows from Britain in the late 19th century. They argue that this was because information about the railroad sector was more readily available and of better quality, due in large part to standardized accounting principles, disclosure requirements of the New York Stock Exchange (NYSE), and regulation by the Interstate Commerce Commission, a precursor to the Securities and Exchange Commission (SEC).

items vary in importance across sectors.[16] Morever, as Fuerst (1998) puts it, it is not just the information itself—Harris (1998) shows us how to compare information generated from different accounting standards—but its credibility.

Credibility of financial information comes from the laws on the books but also, importantly, their enforcement. As noted in Gebhardt (2000), among regulators in G-3 countries, only the SEC reviews filings on a systematic basis and regularly imposes effective sanctions. In the U.K., the Financial Reporting Review Panel reacts only on tips and takes companies to court only as a last resort. And, in Germany, not only is noncompliance vague, but sanctions are weak. Finally, the evidence from Bhattacharya and Daouk (forthcoming) is telling. The introduction of insider trader laws—which in many countries occurred only in the 1990s—does not affect the cost of equity in a country, but their enforcement does. Unfortunately, prosecution has occurred in less than half the countries that have insider trading laws.

An Indirect Measure of Information Asymmetries

While direct measures of information asymmetries do not exist, we do have a proxy for their reduction. Some foreign firms have effectively alleviated costs facing U.S. investors by listing their stocks on U.S. exchanges, either directly or as Level II or Level III American Depositary Receipts (ADRs), or by issuing public debt ("Yankee bonds") in the US.[17] To publicly issue debt or list equity on U.S. exchanges, a foreign firm must reconcile its accounts with U.S. generally accepted accounting principles (GAAP), meet the SEC's stringent disclosure requirements, and subject itself to the associated regulatory burden, tasks that are by no means costless to the firm.[18]

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[16] We thank Trevor Harris for bringing this point to our attention.

[17] We will refer to both the issuance of Yankee bonds and the listing of stocks on U.S. exchanges as listing publicly in the United States, or a public U.S. listing, differentiating debt and equity only where necessary.

[18] We are not suggesting that Level I ADRs reduce information costs to U.S. investors. Level I ADRs trade on the OTC market as pink sheets, are relatively illiquid, and are not subject to the stringent regulatory requirements. In number, the vast majority of ADR programs are Level I; by

Reconciling to U.S. GAAP allows investors to compare companies more easily across industries, irrespective of geography; without this requirement U.S. investors would be confronted with financial statements prepared under at least 40 different sets of accounting principles. The strict U.S. disclosure rules help level the playing field for outsiders. Finally, the regulatory powers of the SEC improve the likelihood that the firm's financial information will be of passable quality. Each of these reduces information costs to U.S. investors.

Others, analyzing the issue from the firm's perspective, have also suggested that cross-listing can alleviate information asymmetries. For example, Lins, Strickland, and Zenner (2000) argue that firms from developing countries that list on U.S. exchanges gain enhanced access to capital markets due to a reduction in information asymmetries that reflects greater disclosure requirements, shareholder rights protection, liquidity, and analyst following. Stulz (1999) argues that firms from countries with lower disclosure requirements cannot credibly communicate their prospects to investors. To raise external funds, such firms might cross-list on an exchange with higher disclosure standards, thereby sending a positive signal to investors. A similar rationale for cross-listing on a market with greater regulatory strictness appears in Fuerst (1998). Finally, La Porta, Lopez-de-Silanes, and Shleifer (1999) analyze ownership concentration in 27 wealthy economies and find that firms from countries with poor shareholder protection are less widely held. They conclude that these firms can improve their access to external capital by listing on a U.S. exchange.

As an example, the case of Daimler Benz's listing on the NYSE in 1993 is illustrative.[19] Accounting rules in Germany give companies wide latitude in how they choose to portray current earnings or financial conditions. In particular, under German GAAP the firm can, with few restrictions, substantially understate or overstate earnings by creating hidden reserves, or provisions. In good times,

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market capitalization, exchange-listed (Levels II and III) ADRs are much greater. See Karolyi (1998) and Miller (1999) for excellent discussions of ADR programs.

[19] This discussion of the Daimler Benz case borrows heavily from Breeden (1994).

reported income can be reduced by creating provisions for potential future adverse events.[20] In bad times, the company can release reserves into current income in a way that masks current losses.

To list on the NYSE, Daimler-Benz had to reconcile its financial statements going back three years. In doing so, the DM200 million profit for the first half of 1993 it had reported under German GAAP became a DM1 billion loss under U.S. GAAP. The difference was an *undisclosed* release of DM1.5 billion in provisions into income, clearly shown in Daimler's reconciliation to U.S. GAAP. Under German GAAP, only insiders such as the firm's board members--which typically include managers from German banks--knew its true financial condition without the smoothing out by provisions.

The Daimler-Benz example may seem extreme, but other examples suggest it is not uncommon. For example, to get financial information on the troubled Belgian firm Lernout-Hauspie, the Belgian authorities had to access the SEC's EDGAR database.[21]

Cross-Listing Reduces Direct Costs, Too

We note that by listing equity on a U.S. exchange, foreign firms also alleviate direct costs to U.S. investors. The Bank of New York (BONY), the depositary bank that has the biggest share of the ADR business, states that investing in ADRs rather than the underlying security can save investors 10 to 40 bp annually in custodial fees. Moreover, transaction costs are lower on the NYSE than on most foreign stock exchanges and settlement is likely better. Firms that list publicly in the U.S. are also more visible to U.S. investors; Baker, Nofsinger, and Weaver (2000) find that cross-listing on the NYSE is associated with increased analyst coverage. To the extent this makes information more readily available, the cost of gathering information on foreign firms is reduced through a cross-listing.

Finally, it is often noted that a public U.S. listing obviates foreign investment regulations on U.S. institutions. The BONY web site states that ADRs "overcome obstacles that mutual funds, pension

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[20] Under U.S. GAAP the event must be probable and estimable before a reserve may be booked.

[21] *The Economist*, March 3rd 2001.

funds and other institutions may have in purchasing and holding securities outside their local market." It is true that U.S.-listed foreign equities can be held by domestic mutual funds. It is less certain, however, that pension funds use ADRs to obviate foreign investment limits. For example, the New York State Common Retirement Fund, a legal list fund, explicitly states that it is the country of incorporation, not the country of the security, that determines if a security is foreign. ADRs can be held in their domestic equity fund, but they still count towards the limit on foreign investment.[22]

Thus, in our view, while a public U.S. listing reduces direct costs to U.S. investors, the reduction in indirect costs, such as information asymmetries, is likely much more important. Our hypothesis is that foreign firms that list on U.S. exchanges or issue Yankee bonds, and thereby reduce information costs for U.S. investors, are more likely to be held by U.S. investors. At the country level, we expect the extent to which a country's firms list in the U.S. to be an important determinant of its share in the U.S. foreign equity portfolio. In the statistical analysis that follows, we use a control variable to separate out the direct- and indirect-cost effects of a cross-listing.

VI. Statistical Analysis

This section explores possible determinants of the distribution of U.S. home bias across countries. The empirical specifications used in the paper are generally of the following form:

$$BIAS_i = a + \beta X_i + e_i \tag{2}$$

where BIAS is the degree of U.S. investors' home bias against country i and X is a vector of independent variables that includes direct and indirect barriers to international investment as well as

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[22] It is often thought that ADRs can enter the U.S. equity indexes, and hence would be more likely to be held by U.S. investors. For the S&P 500, ADRs, like any stocks headquartered in foreign countries, are screened out of the universe of possible stocks. In the early 1990s, the Index Committee ruled that no non-US companies would be added to the index, but that the eight foreign stocks in the index at that time would not be removed. Offshore registered companies that are essentially U.S. entities (based on operations, trading, etc.) may be considered for inclusion on a case-by-case basis. See www.spglobal.com for more information.

control variables such as trade (a proxy for familiarity) and historical risk-adjusted returns (to capture returns-chasing behavior). The precise definitions of these variables will be discussed next.

Description of Explanatory Variables

Motivated by recent theoretical developments in the home bias literature and our discussion in the previous section, we begin by exploring the importance of asymmetric information in accounting for variation in the degree of U.S. investors' home bias across countries. If asymmetric information is an important factor in explaining the home bias puzzle, then we would expect to see some correlation between variations in the degree of home bias across countries and proxies for informational segregation.

With this in mind, we construct a variable, USLISTED, that measures the share of a country's stock market that is publicly listed in the United States. The public listing can take the form of either a listing on a U.S. exchanges, either directly or as a Level II or Level III ADR, or the issuance of public debt (or "Yankee bonds") in the United States. Note that we are explicitly not considering Level I ADRs. As discussed earlier, to the extent that a public U.S. listing makes a foreign company's stock more attractive to U.S. investors by lowering information costs, we would expect U.S. investors to hold a relatively larger share of equities from countries that have higher shares of their stock markets publicly listed in the United States. Values for the shares of countries' stock markets that were publicly listed in the U.S. as of end-1997 are reported in Data Appendix B. These shares vary widely by country, with the Netherlands leading the way at 81 percent, followed by Ireland, Portugal, and Argentina, which are each over 50 percent.

Figure 4 plots the share of each foreign country's stock market publicly listed in the U.S. versus the degree of home bias, BIAS. Recall that BIAS is one minus the ratio of the shares in U.S. to world portfolios; when BIAS is equal to zero there is no home bias, and as the measure increases the bias (or underweighting) is more severe. A striking feature of the pattern in the figure is the strong negative correlation between a country's propensity to list publicly in the U.S. and the degree of bias; the correlation is negative 0.76.

Another possible determinant of the distribution of bias across countries is international trade. For example, it may well be that by purchasing goods and services produced by foreign firms, U.S. investors glean information about these companies. At the very least, investors may be more inclined to hold the stocks of foreign companies with whose products they are most familiar.

To control for the familiarity effects associated with trade, we include two measures of trade links. The first and broadest is TRADE, the amount of trade with the United States as a share of each country's GDP. This variable is plotted in Figure 5. Our second measure of trade links, FDI Sales, is perhaps more relevant from the perspective of information available to U.S. investors. When a foreign firm sets up operations in the United States, not only are U.S. investors more familiar with it products, but they may well work for the firm or live in the proximity of the plant. This represents an even greater familiarity with the firm. To capture this effect we use the data on sales by foreign direct investment (FDI) affiliates in the United States, again deflated by the foreign country's GDP. FDI Sales is available for only 32 of the 48 countries in our sample, and is shown in Figure 6. The difference between FDI Sales and other measures of trade links is highlighted by the values for the Netherlands. As a percent of GDP, trade with the United States is rather small for the Netherlands, but sales by Dutch affiliates in the United States are some 30 percent of Dutch GDP.

Based on the evidence discussed in Section IV, for direct barriers to international investment we include our measure of foreign ownership restrictions in the main regressions. As seen in Figure 7, countries with more severe restrictions are more underweighted in U.S. portfolios.[23] Because data on transaction costs are not available for our 1994 sample, we include them only in ancillary regressions reported in Section VII . Other direct barriers, such as regulations on U.S. institutions and the effect of settlement costs, do not likely have a material effect on home bias, and will not be included in our regressions.

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[23] It should be noted that while a country's first ADR listing is a major determinant of the Bekaert and Harvey (2000b) liberalization dates, subsequent ADR listings are not highly correlated with our restrictions measure. That is, USLISTED is not a proxy for liberalizations.

We also consider the role of historical risk-adjusted returns. If portfolio decisions are based partly on past returns, then U.S. investors might tend to underweight countries whose stock markets have performed poorly. To capture this type of "returns-chasing" behavior à la Bohn and Tesar (1996), we construct a reward-to-risk ratio, which is the mean monthly return over its standard deviation. As is shown in Figure 8, prior to end-1997 risk-adjusted returns were quite high for a number of European countries, but were negative for Japan and the East Asian crisis countries. The figure also suggests a weak negative relationship between risk-adjusted returns and bias.

Finally, we noted in the previous section that by listing equity on a U.S. exchange, foreign firms also alleviate direct costs to U.S. investors, such as custodial fees, transaction costs (if listed on NYSE), and lack of visibility. Thus, our USLISTED variable picks up reductions in these direct costs, in addition to reductions in information costs, which we have argued are likely more important. To disentangle these effects, we use a group of foreign firms that has lowered the direct costs to cross-border investment, but has not necessarily improved the quality of information. This group consists of firms that have Level I ADR programs. Firms that have Level I ADR programs are not subject to the SEC's disclosure requirements, nor must they reconcile to U.S. GAAP, so such programs do not improve the quality of financial information. However, these programs do save the U.S. investor between 10 and 40 basis points in custodial fees—as a depositary institution such as BONY provides the service at a relatively low cost—and may well result in lower transaction costs, as the NYSE is a relatively low cost trading platform. Moreover, Level I ADRs are quoted in dollars and are more visible due to increased analyst coverage (Baker et al., 2000).

As with USLISTED, we form a LEVEL I ADR variable that measures the portion of the foreign market that has a sponsored Level I ADR program.[24] As can be seen in Figure 9, there is not a significant bivariate relationship between the portion of a country's market available in the United States as a Level I ADR and the level of underweighting in U.S. portfolios. Including this variable in our

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[24] Unlike our USLISTED variable, which includes *every* non-U.S. stock listed on U.S. exchanges, coverage on sponsored Level I ADR programs is incomplete for two reasons: The list of Level I programs provided by BONY includes only 505 of the roughly 600 programs that existed at the end of 1997, and of these only 353 appear in Worldscope.

20

multivariate regressions will enable us to differentiate the effects from cross-listing of reducing direct costs and reducing information asymmetries.

Regression Results

Our full sample results are presented in Table 2a. The top half of the table presents results for the 1997 survey; the bottom half is for the 1994 survey. The most striking feature of our results is that in every specification of our regression equation, there exists a strong negative relationship between BIAS and USLISTED, which we interpret to mean that the reduction in information costs associated with a public U.S. listing is an important determinant of the distribution of U.S. investors' bias across countries. The negative coefficient on USLISTED implies that countries whose firms do not alleviate information asymmetries by publicly listing in the United States are more severely underweighted in U.S. equity portfolios. We argued above that the information asymmetries may reflect differences in accounting standards, disclosure requirements, and regulatory environments across countries.

Roughly speaking, the estimated value of the coefficient on the USLISTED variable in implies that if German firms were publicly listed in the U.S. to the same extent as Dutch firms, we would expect the bias against Germany to be significantly lower, falling from 0.85 to 0.57. Moreover, if all foreign firms were publicly listed in the United States—instead of 20 percent as of end-1997—we would expect the overall U.S. bias to fall from 0.8 to less than 0.5. Put another way, assuming that foreign markets maintain their 50 percent share of the world portfolio, the share of foreign equities in the U.S. portfolio would increase from 10 to 25 percent.

Focusing first on the 1997 results, we see in column 2 that RESTRICT, our measure of foreign ownership restrictions, is negatively related to BIAS and statistically significant. Not surprisingly, countries with more extensive foreign ownership restrictions are more underweighted in U.S. portfolios. While this suggests that capital controls affect the distribution of international portfolios in a statistical sense, the small size of the coefficient verifies the view of the existing literature that capital controls are no longer a likely cause of home bias. For example, if restrictions were completely eliminated in every country, home bias would fall only one percentage point from about 0.80 to 0.79.

21

Both measures of trade links, TRADE and FDI Sales, have the expected sign (columns 3 and 4), but neither is statistically significant. While it is true that U.S. investors are less underweight against the two countries most closely linked to the United States, Mexico and Canada, on average we find no significant relationship between trade and home bias.[25] The use of alternative measures of trade links—for example, U.S. imports from each country as a share of that country's GDP—does not alter this result.[26] Our measure of risk-adjusted returns, REWRISK, turns up positively related to BIAS, but with a t-statistic near zero.

In column 6 we include the variable that measures the portion of the foreign market that is available as a Level I ADR. We noted above that such programs reduce direct costs incurred by U.S. investors, but do not reduce information asymmetries. From column 6 (and Figure 9), we can conclude that the reduction of direct costs associated with a cross-listing is not a significant factor in the distribution of U.S. equity portfolios.

Our full sample results are robust across the two sample dates. For 1994, the story is very similar to 1997, although REWRISK and FDI Sales gain explanatory power. USLISTED is still positive and explains about 50 percent of the variation in home bias. Trade remains insignificant.[27]

In Tables 2b-2d we present a series of robustness checks in which the sample is limited to countries with particular characteristics. In Table 2b we restrict the sample to those countries that have

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[25] This contrasts with the results of Honohan and Lane (2000), who find that trade is the main determinant of the composition of Ireland's foreign securities portfolio.

[26] Obstfeld and Rogoff (2000) construct a two-country model in which trade costs in goods markets give rise to home bias in both portfolio and consumption decisions. In their model, equilibrium portfolio shares are proportional to consumption shares, and home bias arises because households face "iceberg" costs of trade on goods shipped abroad. Extending this intuition into a multi-country framework, we suspect that any explanation of home bias based on trading costs in goods markets would likely imply a positive correlation between U.S. purchases of foreign equities and goods across countries, an implication seemingly at odds with our finding that trade links are unrelated to home bias.

[27] It is perhaps interesting to note that Warnock and Mason (2001) find that if bias is computed using holdings *estimated* from transactions data and valuation adjustments, trade becomes significant.

at least one public U.S. listing. For the 1997 regressions, dropping the ten countries without U.S. listings does not substantially affect the results: A little over 50 percent of the variation in home bias is explained by USLISTED, RESTRICT has some explanatory power, and the measures of trade links and risk-adjusted returns have no explanatory power. In 1994, only 28 countries had at least one public U.S. listing. Even so, the results are very similar to the full sample results reported in Table 2a. Specifically, USLISTED and RESTRICT are significant and have the expected sign in (almost) every regression, while FDI Sales and REWRISK are only slightly less accurately estimated. The portion of the market available as a Level I ADR is, again, not significant, nor is it significant in either of the next two cuts of the data.

In Tables 2c, we limit the sample to those countries with foreign ownership restrictions, effectively all of the developing countries in our sample.[28] Since the sample size is quite small in these regressions, the results should be interpreted cautiously. Starting with the bottom panel, in March 1994 U.S. investors were less underweight developing countries whose firms tended to publicly list in the United States; that had less severe capital controls; that had greater sales in the U.S. by affiliates (although this is based on a sample of only nine); and whose markets performed better. Going forward to 1997, trade links become more significant, at the expense of RESTRICT, possibly because many developing countries had gone a long way towards dismantling capital controls (although some, such as Malaysia, were to later reinstitute them), taking some of the explanatory power from the measure. Moreover, for many of these countries, an increased willingness to tap into global capital markets coincided with (or was part of) the liberalization process, suggesting that USLISTED is likely capturing part of the effect of lower restrictions in this sample.

Table 2d presents results with the sample limited to those countries without foreign ownership restrictions. The results for this group of developed countries are broadly consistent with those from Tables 2a and 2c: USLISTED is highly significant, FDI Sales is marginally significant, and TRADE and REWRISK are insignificant. Some differences are noticeable. For example, the point estimates for USLISTED are consistently smaller than for the developing countries (Table 2c), although the

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[28] The one exception is Poland, a developing country that had no foreign ownership restrictions.

differences are not statistically significant. Once again, we caution that the sample sizes in these regressions are small.

In Table 3 we examine the extent to which we can explain *changes* in home bias from 1994 to 1997. Given the results for the levels regressions, we focus on USLISTED and RESTRICT and do not report results for the other explanatory variables. Some evidence of catching up is apparent in the table: Countries that in 1994 were more underweight in U.S. portfolios or had a smaller share of their market publicly listed in the U.S. tended to see the largest increases in their relative weightings. And, in all but the developed country sample (column 3), the greater the increase in public U.S. listings between 1994 and 1997, the greater is the reduction in bias. Neither the level of restrictions in 1994 nor the subsequent change through 1997 independently affects the change in bias.

Caveats

We note that the main independent variable in our regression equations, the portion of the foreign market that is cross-listed on U.S. exchanges or has issued Yankee bonds, might be endogenous. Due to the high costs involved with listing in the United States, only firms that anticipate that the listing will be met by strong investor demand will choose to list. For example, the listing fee alone can be $2 million on the NYSE, on top of which must be added the considerable costs of reconciling financial accounts with U.S. GAAP, costs that can amount to greater than $1 million for large firms from industrial countries. Hence, it could be argued that the causality goes from prospective U.S. demand to U.S. listings. However, we would argue that this prospective demand is conditional on listing on a U.S. exchange. Supporting our view is the evidence that foreign stocks experience abnormal returns just after the announcement of a U.S. listing (Miller,1999) and during the process of regulatory and exchange approval (Foerster and Karolyi, 1999); if U.S. demand was already present, abnormal returns should not be evident. Moreover, the stock price reaction of Yankee bond offerings is positive and significant, especially for first-time issuers (Miller and Puthenpurackal, 2000).

It may also be that third factors determine both bias and listing. We control for some of these in our regressions. For example, firms that have high ratios of U.S. to total sales may be more likely to list

here, and U.S. investors may naturally have more information on these firms and hence may be more likely to hold their stocks. Evidence supporting the first link, from high foreign sales to cross-listing, is provided by Pagano, Roell, and Zechner (1999) and Sarkissian and Schill (1999).[29] We controlled for this familiarity effect by including measures of trade links and sales by foreign affiliates in the United States.

VII. Extensions

In this section we extend our analysis to directly address the roles of transaction costs, accounting standards, and regulatory environments in the country distribution of U.S. investors' home bias. Due to data and degrees of freedom limitations, these variables are not included in the main regressions reported above.[30]

Transaction Costs

The role of transaction costs in home bias has been downplayed in the literature. For example, French and Poterba (1991) and Cooper and Kaplanis (1986) conclude that costs would have to be implausibly high to explain the observed home bias. Moreover, Tesar and Werner (1995) provide evidence that investors turn over their foreign portfolios more frequently than their domestic portfolios, which is inconsistent with transaction costs being large enough to significantly impede international investment.[31] None of these studies, however, use data on transaction costs to reach their conclusions, perhaps because until 1996 such data did not exist across a wide range of countries.

To control for the effects of transaction costs we use the Elkins-McSherry Co. measure of trading costs across 41 foreign markets. This measure, shown in Figure 10 and analyzed in Willoughby (1997) and Domowitz, Glen, and Madhaven (2000), is comprised of three components: commissions,

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[29] Other studies on why firms cross-list are Karolyi (1998) and Saudagaran (1988).

[30] When included in the main regressions, their coefficients were insignificant.

[31] High turnover rates on foreign equity portfolios are not evident using updated holdings estimates; see footnote 9.

fees, and market impact costs.[32] As the figure shows, it is difficult to discern a relationship between trading costs and our measure of bias across the 41 countries for which the measure is available. Among all but the highest cost countries, however, it does appear that higher cost countries are more underweight in U.S. portfolios.

Table 4 analyzes the effects of trading costs on home bias more formally. In bivariate regressions, trading costs are either insignificantly different from zero (with t-stats less than 0.5) or, in the sample limited to industrial countries (column 3), negative and significant. That is, the simple bivariate relationship suggests that *higher* cost developed countries are less underweight in U.S. portfolios, but that in the full sample and other cuts of the data, no relationship is apparent.

Since trading costs are low on the NYSE—the U.S. exchange on which over 80 percent (by market capitalization) of non-U.S. stocks are listed—firms from high cost countries can effectively lower trading costs in their stock and, hence, broaden their shareholder base by listing in the United States. To capture the effect of the reduction in trading costs associated with a U.S. listing, Table 4 also reports regressions that include an interaction term combining (one minus) costs and listings. Costs are still not positive and significant in these regressions, but the positive coefficient on the interaction term (in all but the developing country regression, which suffers from collinearity) is evidence that high cost countries with a high portion of U.S. listings are less underweight in U.S. portfolios. That is, countries whose firms tend to list on U.S. exchanges are less underweight in U.S. portfolios and high cost countries get an extra boost in U.S. portfolios from the listing. Overall, the results in Table 4 indicate that one way that listing on a U.S. exchange, particularly on the NYSE, reduces home bias is through reduced transaction costs.

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[32] Market impact costs, or liquidity costs, are intended to measure the deviation of the transaction price from the price that would have prevailed had the trade not occurred; see Willoughby (1998) for a discussion.

Accounting Standards

Subject to our doubts about the usefulness of available numeric scores of accounting standards, discussed in Section III, we attempt to directly test the role of accounting standards in home bias. Since the accounting standards measure, ACCT, is only available for 1990 and standards have changed in many countries in the 1990s, we only analyze the 1994 level of bias in this section. The first two columns of Table 5 indicate that while there is only weak evidence that higher accounting standards are associated with less bias, the evidence is stronger that countries with higher scores on rule of law (ROL) are less underweight in U.S. portfolios. When we include USLISTED (column 3), the t-statistics on ACCT and ROL fall toward zero. In the fourth column we include interaction terms. The story that emerges is that countries that are less underweight in U.S. portfolios (i) tend to list on U.S. exchanges, (ii) have both high accounting standards and high scores on rule of law, (iii) have low accounting standards but list on U.S exchanges. That the interaction of high standards and high rule of law is associated with lower bias, but that by themselves accounting standards and rule of law have positive coefficients, underscores the importance of the credibility of the information, not just the quantity.

VIII. Conclusion

The results presented in this paper suggest that information costs are an important factor behind the home bias phenomenon. To list on a U.S. stock exchange or issue public debt in the United States, a foreign firm must reconcile its financial statements with U.S. GAAP, comply with stringent SEC disclosure requirements, and subject itself to the strict U.S. regulatory environment. Doing so alleviates a significant information cost to the U.S. investor. We find, based on a comprehensive data set of U.S. holdings of foreign equities, that countries with a greater share of firms that have public U.S. listings, either equity or debt, tend to be less severely underweighted in U.S. equity portfolios. We also find that a direct barrier, the intensity of foreign ownership restrictions, affects the distribution of the U.S. portfolio. These effects are much stronger than the effects of trade links. We also find some evidence

27

that firms from countries with low accounting standards or high trading costs can improve their prospects with U.S. investors by listing on a U.S. exchange.

We restricted our focus in this paper to the determinants of U.S. investors holdings of foreign *equities*. One avenue for future research is to consider a broader class of assets, including, for example, U.S. investors holdings of foreign bonds, both sovereign and corporate. Along these same lines, an even more wide-ranging study of U.S. investors' exposure to foreign economies might include cross-border bank lending as well as U.S. investors' holdings of equities of U.S. multinationals. Moreover, while our focus was on U.S. portfolios, it would also be interesting to explore other countries' foreign portfolios.

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Data Appendix A : Sources

We include the 48 largest foreign **countries** by 1997 market capitalization. The smallest country in the sample is Pakistan ($11 billion); the largest country excluded is Oman ($7 billion). Data exist for most variables for each of these countries, unless noted.

U.S. holdings of foreign equities are available at www.treas.gov/fpis/ .

Data on **worldwide market capitalizations of non-U.S. stocks listed on U.S. stock markets** are compiled from various sources. For NYSE-listed firms, year-end data were provided by the NYSE, compiled from data from FactSet and Bloomberg. For the 1994Q1 regressions, we use end-1993 NYSE values. Data for non-U.S. firms listed on Nasdaq and Amex are from CompuStat. For all ADRs in the 1997 sample, cross-checks were made using Bank of New York (BONY) ADR Index data for 1998. Data on **Yankee bond issuances** are from Securities Data Corporation, Inc. (SDC). **Level I ADRs** as of end-1997 were identified from a list provided by BONY; market capitalizations, where available, are from Worldscope.

Country-level market capitalization data, which are of domestic firms listed on the domestic market, are from IFC Emerging Markets Factbook 1998 and the International Federation of Stock Exchanges (www.fibv.com). The coverage of IFC is better; FIBV data were used as a cross-check. Differences between the two sources were for the most part small or nonexistant, except for in the data for Ireland, Australia, and New Zealand, where the IFC number was based on an incorrect currency conversion.

Trade data are from IMF *Direction of Trade Statistics Yearbook*, 1999.

FDI Sales data, available for 32 countries, are from the BEA *Survey of Current Business*, Tables 23.2 (August 1999) and 21.1 (July 1996) Selected Data of Nonbank U.S. Affiliates by Country of Ultimate Beneficial Owner.

The measure of **foreign ownership restrictions** is one minus the ratio of the market capitalizations of the IFC Investable and Global Indexes (IFC, 1998). The measure is assumed to be zero for industrial countries that do not have IFCI indexes. See Edison and Warnock (2001).

Transaction costs for 41 countries are from Elkin-McSherry Co. (www.elkins-mcsherry.com).

Reward/risk is the mean return over the standard deviation of returns, where returns are changes in the country's MSCI Price Index calculated over the periods of 15 quarters preceding 1994Q1 and 1997Q4. Data were obtained from www.mscidata.com.

Accounting standards are for 1990 as compiled by the Center for International Financial Analysis and Research. **Rule of law** is for 1982 to 1995 as compiled by the International Country Risk rating agency. Both are taken from La Porta et al. (1998).

Data Appendix B
Share of Foreign Markets Listed on U.S. Exchanges, December 1997

Country	U.S. Listed (% of market capitalization)	Country	U.S. Listed (% of market capitalization)
Major industrial countries		*Other advanced countries, continued*	
United States	100.0	Luxembourg	26.0
United Kingdom	38.7	Austria	0.0
Japan	27.2	Greece	0.4
France	29.3	Australia	42.7
Canada	44.4	Hong Kong	10.0
Germany	17.6	Singapore	4.5
Italy	42.5	Taiwan	5.5
Other advanced countries		Korea	24.5
Netherlands	80.7	New Zealand	42.7
Switzerland	1.3	*Developing Countries*	
Sweden	34.0	*Latin America*	
Spain	39.2	Mexico	33.6
Ireland	64.2	Brazil	24.1
Finland	32.4	Argentina	56.5
Norway	23.1	Chile	38.9
Denmark	21.5	Peru	38.6
Portugal	61.9	Venezuela	13.3
Israel	41.5	Colombia	10.2
Belgium	7.2		

Data Appendix B (continued)
Share of Foreign Markets Listed on U.S. Exchanges, December 1997

Country	U.S. Listed (% of market capitalization)	Country	U.S. Listed (% of market capitalization)
Developing Countries, continued		*Central and Eastern Europe*	
Asia		Russia	0.7
India	0.0	Hungary	33.3
Malaysia	0.0	Czech Republic	0.0
Indonesia	20.0	Poland	0.0
Phillippines	6.5	*Other Developing Countries*	
China	1.3	South Africa	12.2
Thailand	0.0	Turkey	0.0
Pakistan	0.0	Egypt	0.0
		Morocco	0.0

N.B. *U.S. Listed* refers to share of country's stock market that is listed on U.S. exchanges—either directly or as a Level II or III ADR—or has issued public debt in the United States. See Data Appendix A for sources.

Table 1

U.S. Portfolio Holdings and International Stock Market Measures (as of end-1997)

Country	Share in U.S. Equity Portfolio A	Share in World Market Capitalization B	Relative Weight in U.S. Portfolio (relative to market capitalization) C (A/B)	BIAS D (1 - C)
Major industrial countries				
United States	89.9	48.3	1.86	
United Kingdom	1.82	8.5	.21	0.79
Japan	1.14	9.4	.12	0.88
France	0.71	2.9	.25	0.75
Canada	0.59	2.4	.25	0.75
Germany	0.54	3.5	.15	0.85
Italy	0.35	1.5	.24	0.76
Other advanced countries				
Netherlands	0.89	2.0	.45	0.55
Switzerland	0.52	2.5	.21	0.79
Sweden	0.32	1.2	.28	0.72
Spain	0.21	1.2	.17	0.83
Ireland	0.12	0.2	.56	0.44
Finland	0.12	0.3	.40	0.60
Norway	0.08	0.3	.28	0.72
Denmark	0.07	0.4	.19	0.81
Portugal	0.06	0.2	.35	0.65
Israel	0.06	0.2	.31	0.69

Table 1 (continued)

U.S. Portfolio Holdings and International Stock Market Measures as of end-1997

Country	Share in U.S. Equity Portfolio A	Share in World Market Capitalization B	Relative Weight in U.S. Portfolio (relative to market capitalization) C (A/B)	BIAS D (1 - C)
Belgium	0.05	0.6	.09	0.91
Luxembourg	0.04	0.1	.31	0.69
Austria	0.03	0.2	.20	0.80
Greece	0.01	0.2	.09	0.91
Australia	0.26	1.3	.21	0.79
Hong Kong	0.23	1.8	.13	0.87
Singapore	0.09	0.5	.19	0.81
Taiwan	0.04	1.2	.03	0.97
Korea	0.04	0.2	.21	0.79
New Zealand	0.04	0.1	.35	0.65
Developing Countries				
Latin America				
Mexico	0.29	0.7	.44	0.56
Brazil	0.26	1.1	.24	0.76
Argentina	0.11	0.3	.43	0.57
Chile	0.04	0.3	.12	0.88
Peru	0.02	0.1	.26	0.74
Venezuela	0.02	0.1	.27	0.73
Colombia	0.01	0.1	.07	0.93

Table 1 (continued)

U.S. Portfolio Holdings and International Stock Market Measures as of end-1997

Country	Share in U.S. Equity Portfolio A	Share in World Market Capitalization B	Relative Weight in U.S. Portfolio (relative to market capitalization) C (A/B)	BIAS D (1 - C)
Asia				
India	0.05	0.6	.09	0.91
Malaysia	0.04	0.4	.10	0.90
Indonesia	0.02	0.1	.17	0.83
Phillippines	0.02	0.1	.18	0.82
China	0.02	0.9	.02	0.98
Thailand	0.02	0.1	.18	0.82
Pakistan	0.01	0.1	.21	0.79
Central and Eastern Europe				
Russia	0.07	0.5	.13	0.87
Hungary	0.03	0.1	.46	0.54
Czech Republic	0.01	0.1	.12	0.88
Poland	0.01	0.1	.26	0.74
Other Developing				
South Africa	0.08	1.0	.08	0.92
Turkey	0.05	0.3	.19	0.81
Egypt	0.01	0.1	.07	0.93
Morocco	0.01	0.1	.04	0.96

Sources: Treasury Department and Federal Reserve Board (2000); International Finance Corporation (1998); NYSE; CompuStat; authors' calculations. Data for 1994 available from authors.

Table 2a
Results: Full Sample

	(1)	(2)	(3)	(4)	(5)	(6)
	1997					
USLISTED	-0.43*** (0.06)	-0.39*** (0.06)	-0.39*** (0.06)	-0.41*** (0.08)	-0.37*** (0.06)	-0.40*** (0.07)
RESTRICT		0.08** (0.04)	0.08** (0.04)	0.08* (0.05)	0.09* (0.05)	0.08 (0.06)
TRADE			-0.08 (0.12)		-0.10 (0.13)	-0.07 (0.12)
FDI SALES				-0.12 (0.13)		
REWRISK					0.01 (0.08)	0.01 (0.08)
LEVEL I ADRs						-0.09 (0.10)
N	48	48	48	32	43	43
Adjusted R^2	0.52	0.53	0.53	0.53	0.49	0.49
	1994					
USLISTED	-0.53*** (0.07)	-0.44*** (0.07)	-0.45*** (0.07)	-0.38*** (0.07)	-0.43*** (0.07)	
RESTRICT		0.10*** (0.04)	0.10*** (0.04)	0.09* (0.05)	0.12*** (0.04)	
TRADE			-0.07 (0.13)		0.04 (0.09)	
FDI SALES				-0.21 (0.17)		
REWRISK					-0.21* (0.13)	
N	44	39	39	27	31	
Adjusted R^2	0.48	0.52	0.51	0.47	0.57	

Notes. Dependent variable is BIAS. Constants are included but not reported. USLISTED is the share of the foreign market that is cross-listed on U.S. exchanges (i.e., has a Level II or III ADR program or a direct listing) or has issued public debt in the United States. RESTRICT is a measure of foreign ownership restrictions; see text for description. TRADE and FDI SALES are expressed as a share of the foreign country's GNP. REWRISK is the mean over standard deviation of monthly returns calculated over a 15-quarter period. LEVEL I ADRs is the share of the foreign market that has a Level I ADR program. White (1980) standard errors are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 2b

Results: Sample Limited to Countries with Listings on U.S. Exchanges

	(1)	(2)	(3)	(4)	(5)	(6)
	1997					
USLISTED	-0.48*** (0.06)	-0.45*** (0.07)	-0.45*** (0.06)	-0.43*** (0.09)	-0.43*** (0.09)	-0.49*** (0.07)
RESTRICT		0.08* (0.04)	0.09** (0.04)	0.07 (0.05)	0.07 (0.05)	0.04 (0.05)
TRADE			-0.15 (0.15)		-0.19 (0.16)	-0.14 (0.15)
FDI SALES				-0.14 (0.14)		
REWRISK					-0.05 (0.08)	-0.04 (0.08)
LEVEL I ADRs						-0.16 (0.13)
N	38	38	38	30	36	36
Adjusted R^2	0.53	0.53	0.54	0.53	0.57	0.57
	1994					
USLISTED	-0.47*** (0.08)	-0.42*** (0.09)	-0.43*** (0.09)	-0.35*** (0.09)	-0.42*** (0.08)	
RESTRICT		0.09* (0.05)	0.09* (0.05)	0.08 (0.06)	0.14** (0.06)	
TRADE			-0.11 (0.16)		0.03 (0.11)	
FDI SALES				-0.22 (0.23)		
REWRISK					-0.20 (0.15)	
N	28	26	26	22	24	
Adjusted R^2	0.44	0.45	0.43	0.36	0.44	

Notes. Dependent variable is BIAS. See Table 2a.

Table 2c

Results: Sample Limited to Countries with Foreign Ownership Restrictions

	(1)	(2)	(3)	(4)	(5)	(6)
	1997					
USLISTED	-0.51*** (0.08)	-0.47*** (0.08)	-0.48*** (0.08)	-0.71*** (0.18)	-0.50*** (0.09)	-0.50*** (0.09)
RESTRICT		0.05 (0.05)	0.05 (0.06)	0.05 (0.05)	0.07 (0.06)	0.07 (0.06)
TRADE			-0.24* (0.14)		-0.28 (0.15)	-0.12 (0.18)
FDI SALES				-0.30 (0.22)		
REWRISK					0.15 (0.10)	0.17 * (0.09)
LEVEL I ADRs						-0.37 (0.27)
N	25	25	25	11	20	20
Adjusted R^2	0.56	0.56	0.58	0.59	0.60	0.61
	1994					
USLISTED	-0.70*** (0.15)	-0.53*** (0.10)	-0.54*** (0.10)	-0.63** (0.25)	-0.40*** (0.09)	
RESTRICT		0.20*** (0.06)	0.20*** (0.06)	0.36*** (0.07)	0.23*** (0.06)	
TRADE			-0.24 (0.27)		0.02 (0.26)	
FDI SALES				-0.40*** (0.08)		
REWRISK					-0.28** (0.13)	
N	20	20	20	9	13	
Adjusted R^2	0.30	0.50	0.50	0.76	0.64	

Notes. Dependent variable is BIAS. See Table 2a.

Table 2d

Results: Sample Limited to Countries without Foreign Ownership Restrictions

	(1)	(2)	(3)	(4)	(5)	(6)
	1997					
USLISTED	-0.34*** (0.09)		-0.34*** (0.09)	-0.37*** (0.09)	-0.32*** (0.08)	-0.32*** (0.10)
TRADE			0.03 (0.09)		0.02 (0.10)	0.02 (0.10)
FDI SALES				-0.17 (0.12)		
REWRISK					-0.06 (0.11)	-0.06 (0.11)
LEVEL I ADRs						0.01 (0.12)
N	23		23	21	23	23
Adjusted R^2	0.41		0.38	0.46	0.35	0.32
	1994					
USLISTED	-0.47*** (0.09)		-0.47*** (0.09)	-0.44*** (0.08)	-0.46*** (0.09)	
TRADE			0.02 (0.076		0.04 (0.07)	
FDI SALES				-0.19 (0.14)		
REWRISK					-0.03 (0.19)	
N	19		19	18	18	
Adjusted R^2	0.56		0.54	0.53	0.47	

Notes. Dependent variable is BIAS. See Table 2a.

Table 3

Results: Change in Home Bias

	(1) Full Sample	(2) Countries with Foreign Ownership Restrictions	(3) Countries without Foreign Ownership Restrictions	(4) Countries with U.S. Listings
	1994 - 1997			
BIAS 1994	-0.22** (0.10)	-0.06 (0.15)	-0.27** (0.12)	-0.16* (0.08)
USLISTED 1994	0.12* (0.07)	0.05 (0.13)	0.17** (0.08)	0.06 (0.06)
RESTRICT 1994	0.04 (0.04)	-0.05 (0.06)		0.01 (0.05)
? USLISTED	-0.12* (0.07)	-0.20*** (0.08)	-0.03 (0.10)	-0.22*** (0.06)
? RESTRICT	0.07 (0.07)	0.03 (0.09)		0.03 (0.06)
N	39	19	20	32
Adjusted R^2	0.35	0.0	0.62	0.16

Notes. Dependent variable is the change in BIAS from 1994 to 1997. The changes in RESTRICT and USLISTED are also from 1994 to 1997. See notes to Table 2a for more complete descriptions. Constants are included but not reported. White (1980) standard errors are in parentheses. ***,**, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 4
Results: Effect of Transaction Costs on Bias

	(1) Full Sample		(2) Countries with Foreign Ownership Restrictions		(3) Countries without Foreign Ownership Restrictions		(4) Countries with U.S. Listings	
COSTS	-0.03 (0.11)	0.13 (0.11)	-0.03 (0.15)	-0.14 (0.25)	-0.48* (0.25)	-0.16 (0.17)	-0.06 (0.11)	0.15 (0.13)
USLISTED		-1.01*** (0.25)		-0.30 (0.81)		-0.74*** (0.22)		-1.11*** (0.27)
(1 - COSTS) * USLISTED		1.69** (0.70)		-0.66 (2.48)		1.07 (0.70)		1.82** (0.76)
N	41	41	19	19	22	22	35	35
Adjusted R^2	0.0	0.54	0.0	0.46	0.16	0.58	0.0	0.53

Notes. Data are for 1997. See notes to Table 2a. Dependent variable is the level of BIAS for 1997. COSTS are relative transaction costs, calculated by normalizing the Elkins-McSherry Co. data by the highest cost country (Korea). Constants are included but not reported. White (1980) standard errors are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 5
Results: Effects of Accounting Standards and Rule of Law on Bias

	(1)	(2)	(3)	(4)
	1994			
ACCT	-0.16 (0.15)		0.08 (0.13)	-0.37 (0.33)
ROL		-0.02*** (0.01)	-0.01 (0.01)	0.04* (0.03)
USLISTED			-0.49*** (0.08)	-1.46*** (0.31)
ACCT * ROL				-0.08* (0.04)
ACCT * USLISTED				2.55*** (0.85)
ROL * USLISTED				-0.57 * (0.42)
N	37	39	37	37
Adjusted R^2	0.0	0.13	0.48	0.50

Notes. ACCT is 1990 accounting standards as compiled by the Center for International Financial Analysis and Research. ROL is 1982 to 1995 rule of law as compiled by the International Country Risk rating agency. Both ACCT and ROL are taken from La Porta *et al* (1998). Dependent variable is the level of BIAS in 1994. Constants are included but not reported. White (1980) standard errors are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Figure 1(a): Share of Foreign Equities in World and U.S. Portfolios
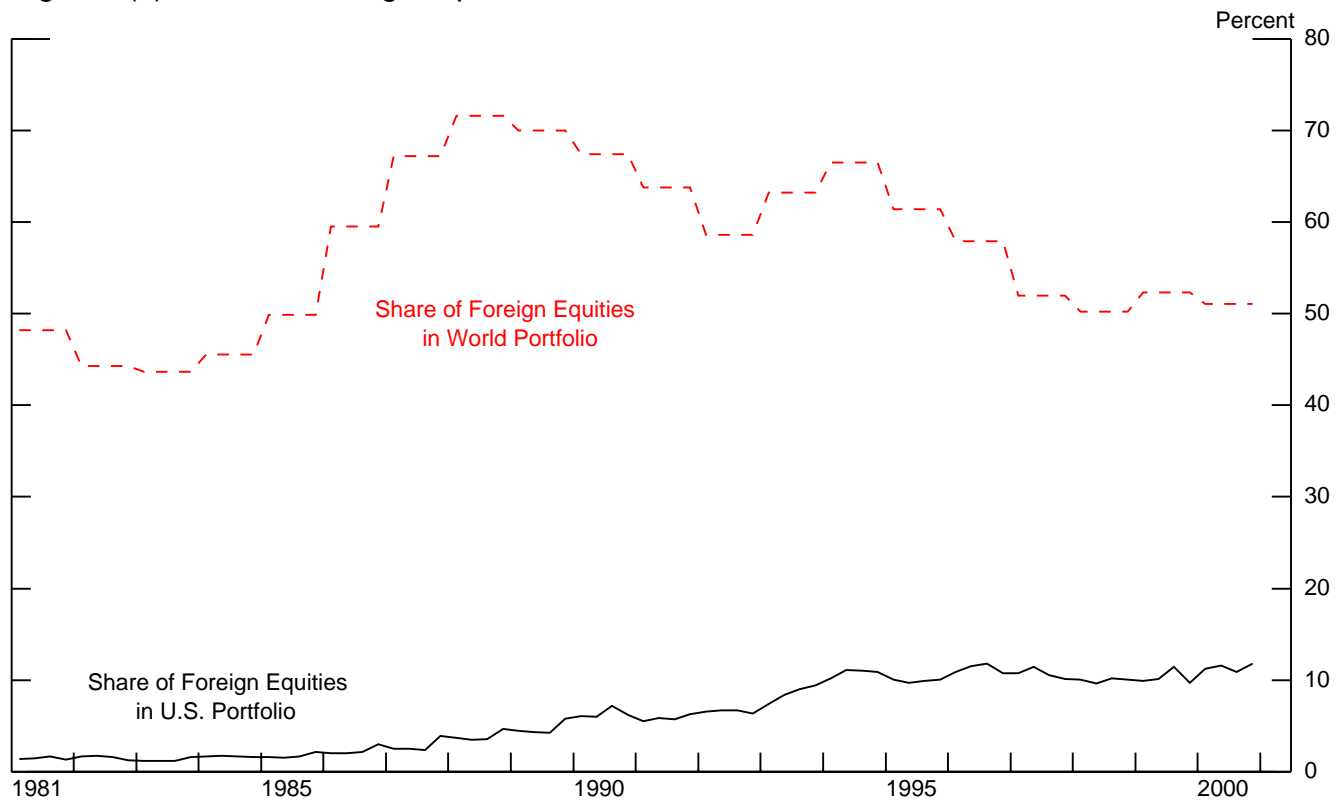
Sources: International Finance Corporation, International Federation of Stock Exchanges, and Federal Reserve Board.

Figure 1(b): Home Bias

$$\text{Home Bias} = 1 - \frac{\text{Share of Foreign Equities in U.S. Portfolio}}{\text{Share of Foreign Equities in World Portfolio}}$$
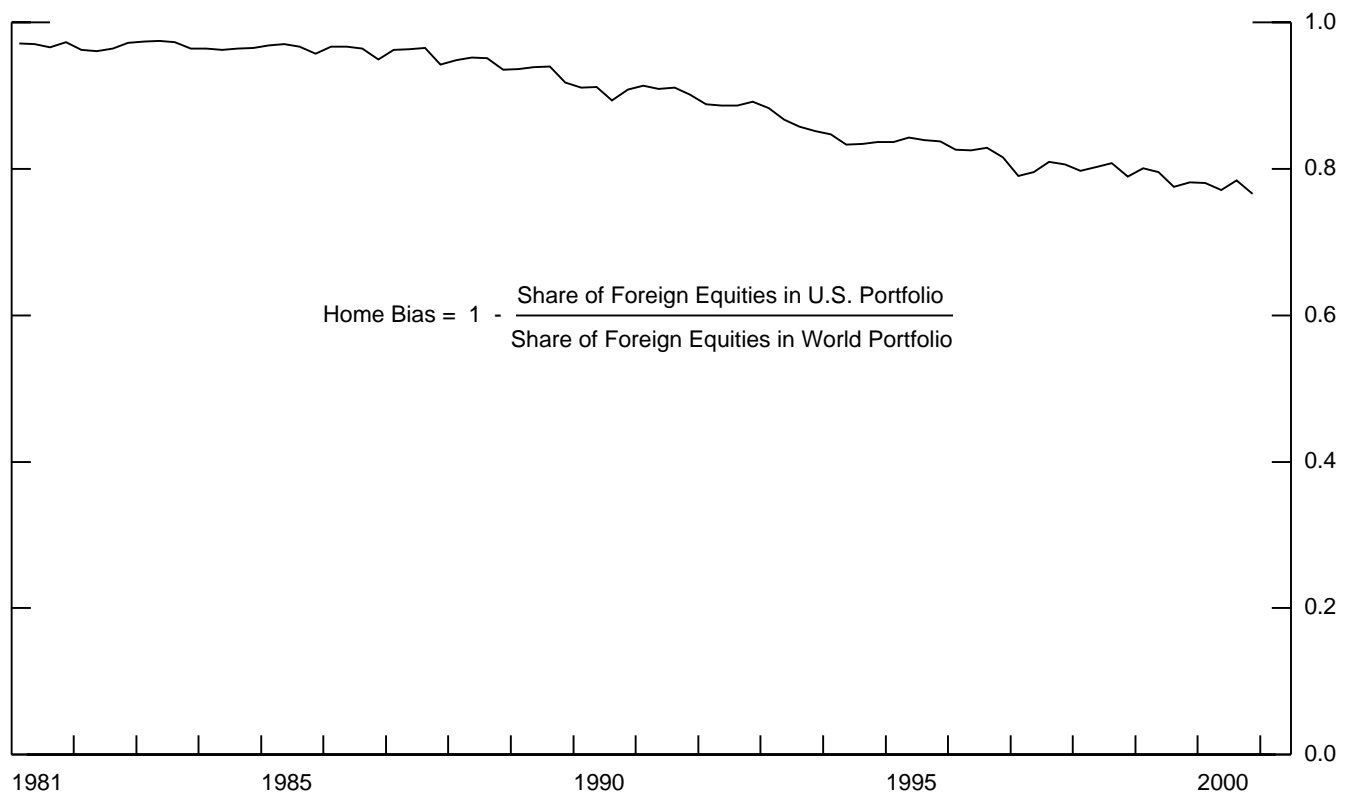
Figure 2(a): Official Estimates of U.S. Holdings of Foreign Equities

Billions of Dollars

Current

Pre '97 Survey

Pre '94 Survey

e

e = Authors' estimate
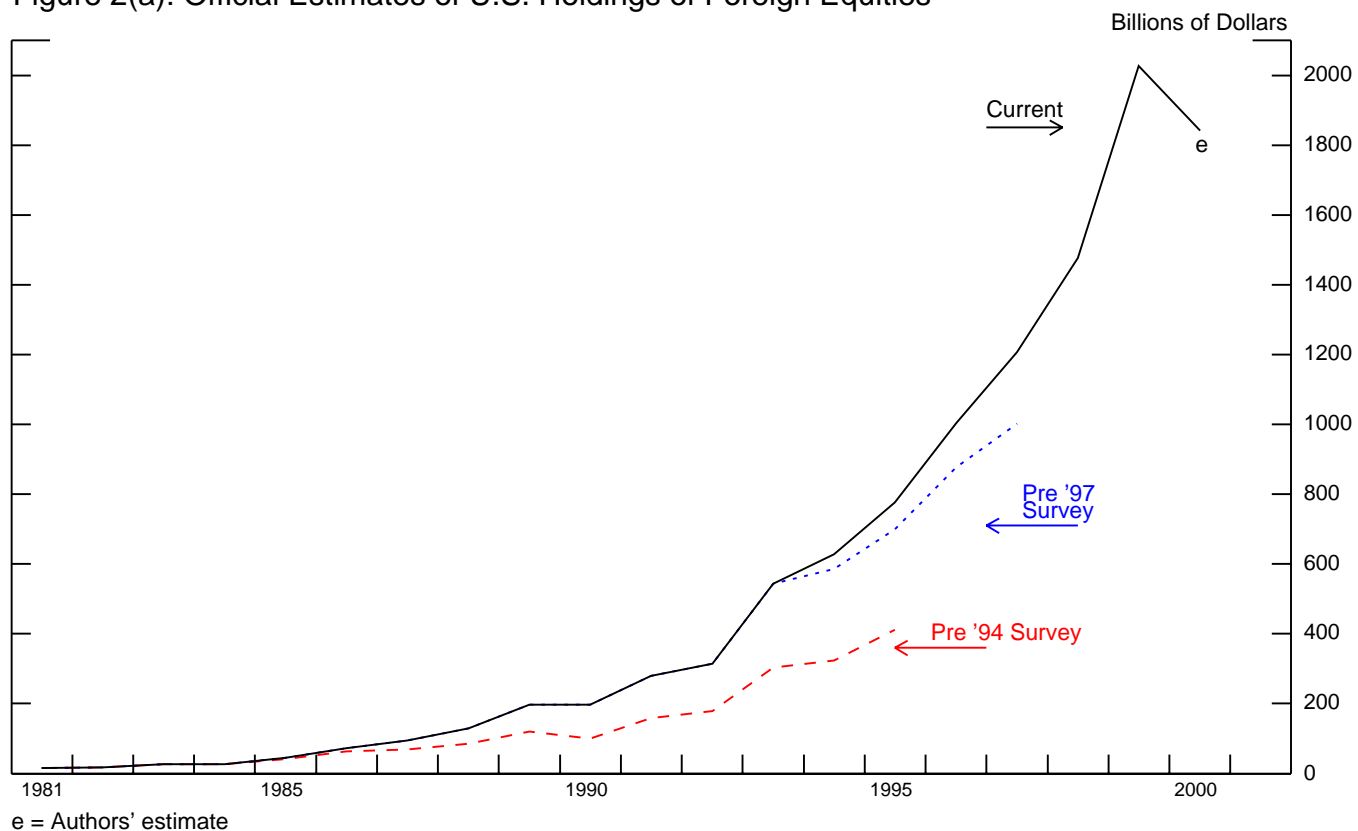
Figure 2(b): Ratio of Holdings Estimates*
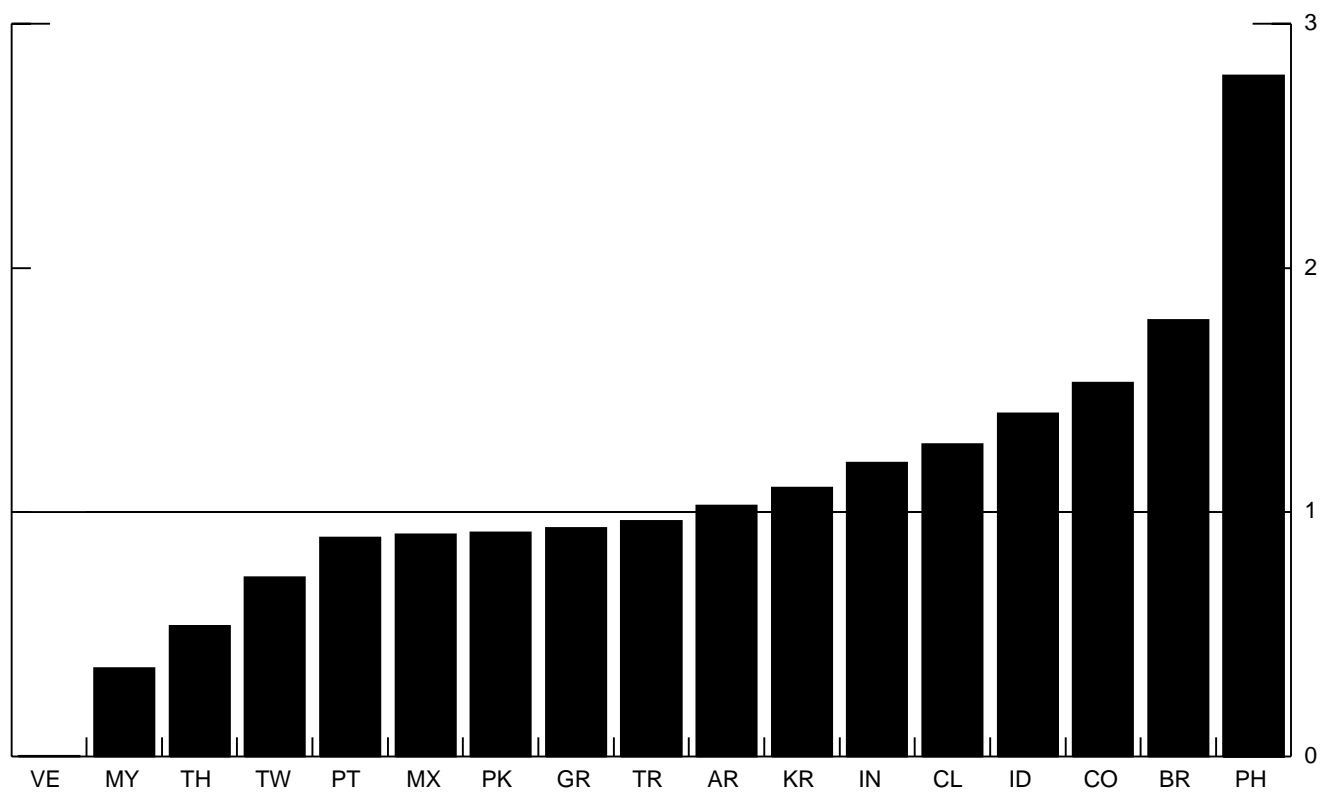
*Ratio of December 1995 estimates of Bekaert and Harvey (2000b) to Warnock and Mason (2001).

Figure 3(a): Foreign Ownership Restrictions, Korea
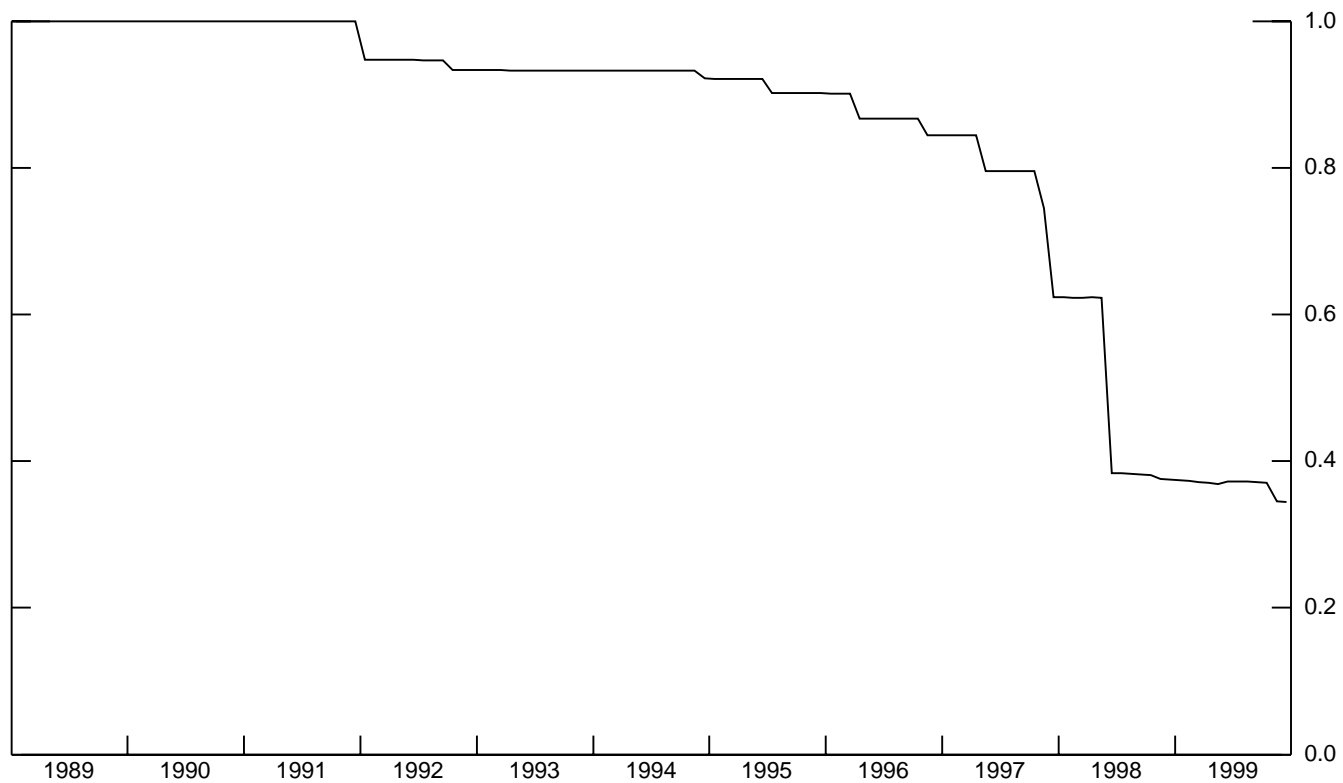
Figure 3(b): Foreign Ownership Restrictions, 1997
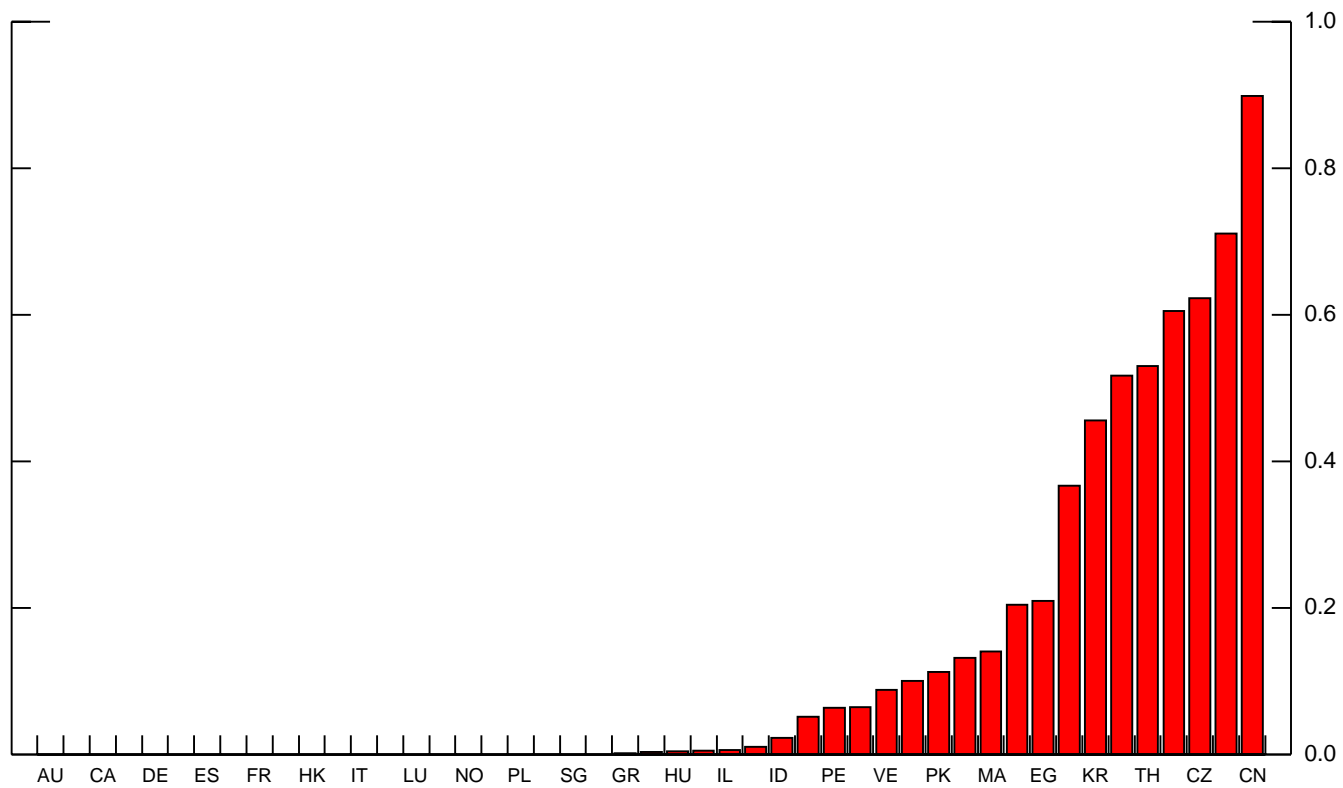
FOR = 1 - mkt cap (IFCI) / mkt cap (IFCG)

Figure 4: Share of Foreign Market Listed on U.S. Exchanges
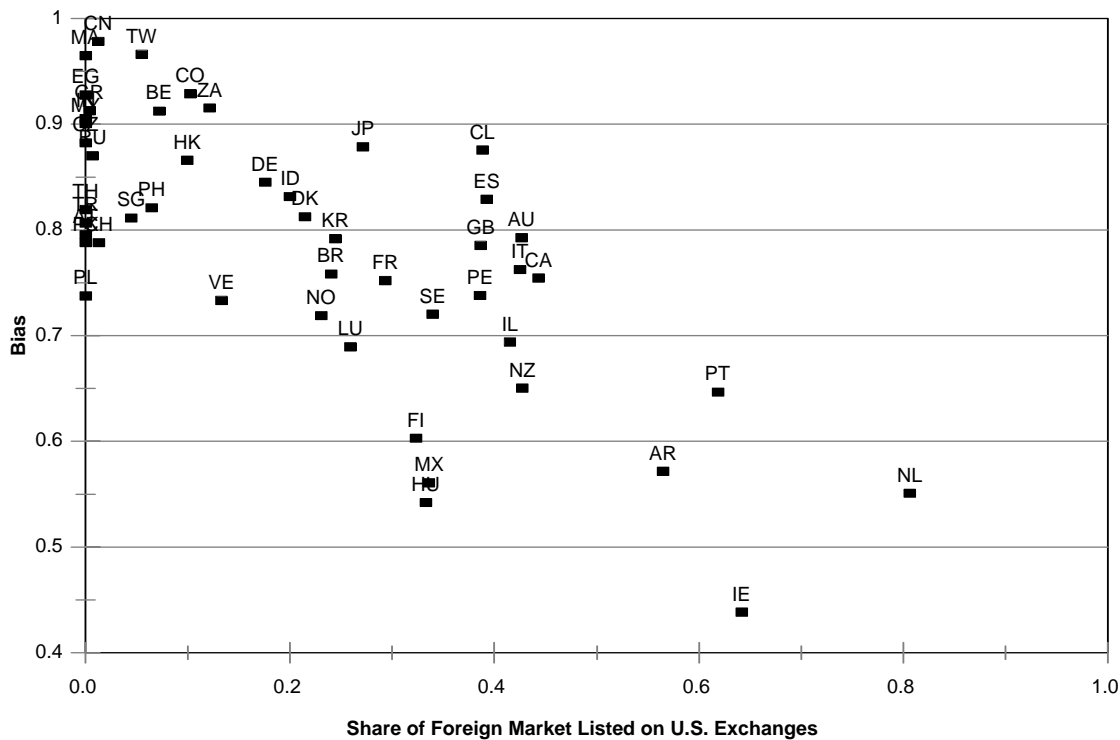
Notes: Data are for 1997. Bias, or underweighting in the U.S. portfolio, is one minus the relative weight of a country's equities in the U.S. portfolio to its weight in world market capitalization. The share of the foreign market that is listed on U.S. exchanges is calculated as the worldwide market capitalization of a country's firms that have listed on U.S. exchanges divided by the country's total market capitalization. See Data Appendix A for sources.
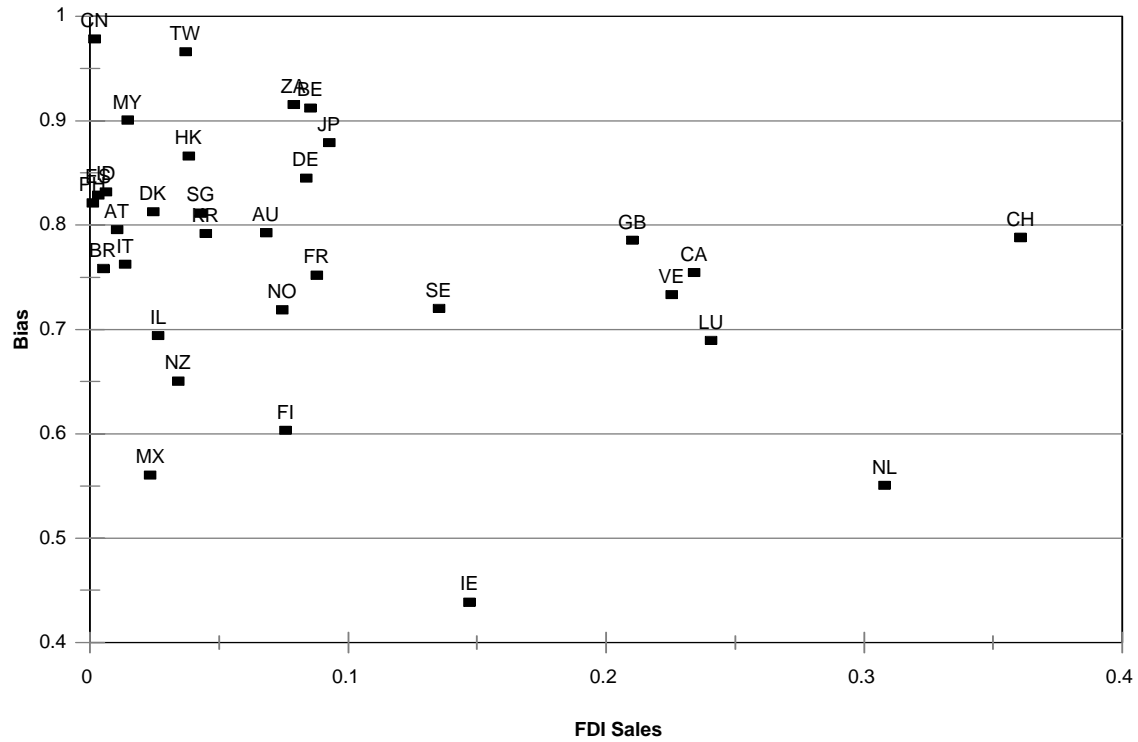
Country Codes:

|							
AR	Argentina	DK	Denmark	IN	India	PH	Philippines
AT	Austria	EG	Egypt	IT	Italy	PK	Pakistan
AU	Australia	ES	Spain	JP	Japan	PL	Poland
BE	Belgium	FI	Finland	KR	Korea	PT	Portugal
BR	Brazil	FR	France	LU	Luxumbourg	RU	Russia
CA	Canada	GB	Great Britain	MA	Morocco	SE	Sweden
CH	Switzerland	GR	Greece	MX	Mexico	SG	Singapore
CL	Chile	HK	Hong Kong	MY	Malaysia	TH	Thailand
CN	China	HU	Hungary	NL	Netherlands	TR	Turkey
CO	Colombia	ID	Indonesia	NO	Norway	TW	Taiwan
CZ	Czech	IE	Ireland	NZ	New Zealand	VE	Venezuela
DE	Germany	IL	Israel	PE	Peru	ZA	South Africa

Figure 5: Trade
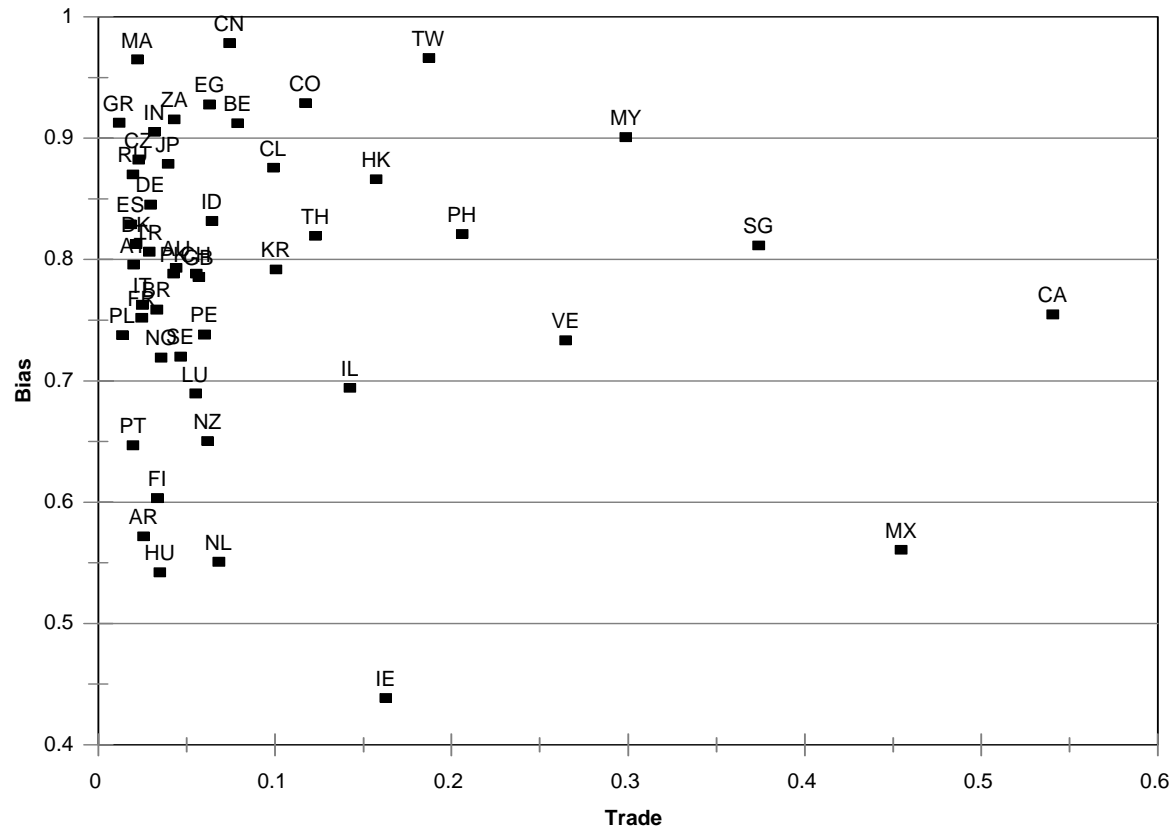
Notes: Data are for 1997. TRADE for country *i* is country *i*'s total trade with the United States as a proportion of country *i*'s GNP. See Figure 4 and Data Appendix A for country codes, sources, and other definitions.

**Figure 6: Sales by FDI Affiliates in the U.S.**

Notes: Data are for 1997. FDI SALES for country i is sales by country i's affiliates in the United States as a proportion of country i's GNP. See Figure 4 and Data Appendix A for country codes, sources, and other definitions.

**Figure 7: Foreign Ownership Restrictions**
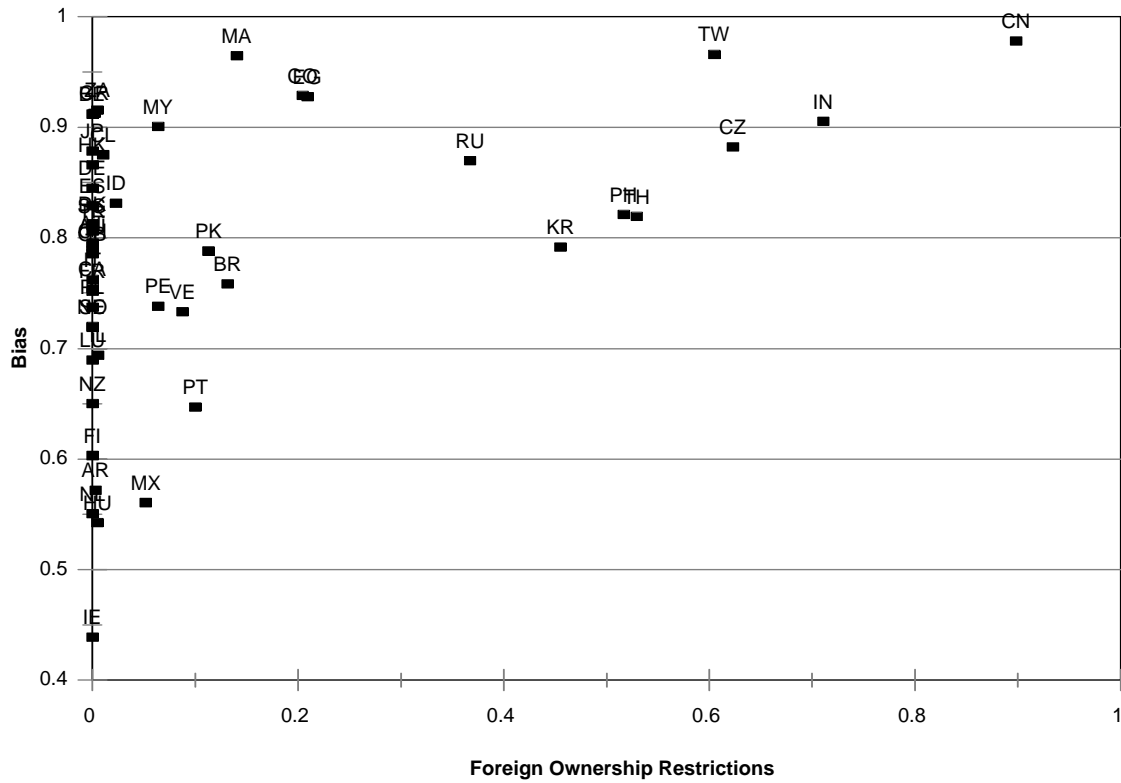
Notes: Data are for 1997. The measure of foreign ownership restrictions is from Edison and Warnock (2001). See Figure 4 and Data Appendix A for country codes, sources, and other definitions.

Figure 8: Reward-to-Risk Ratio
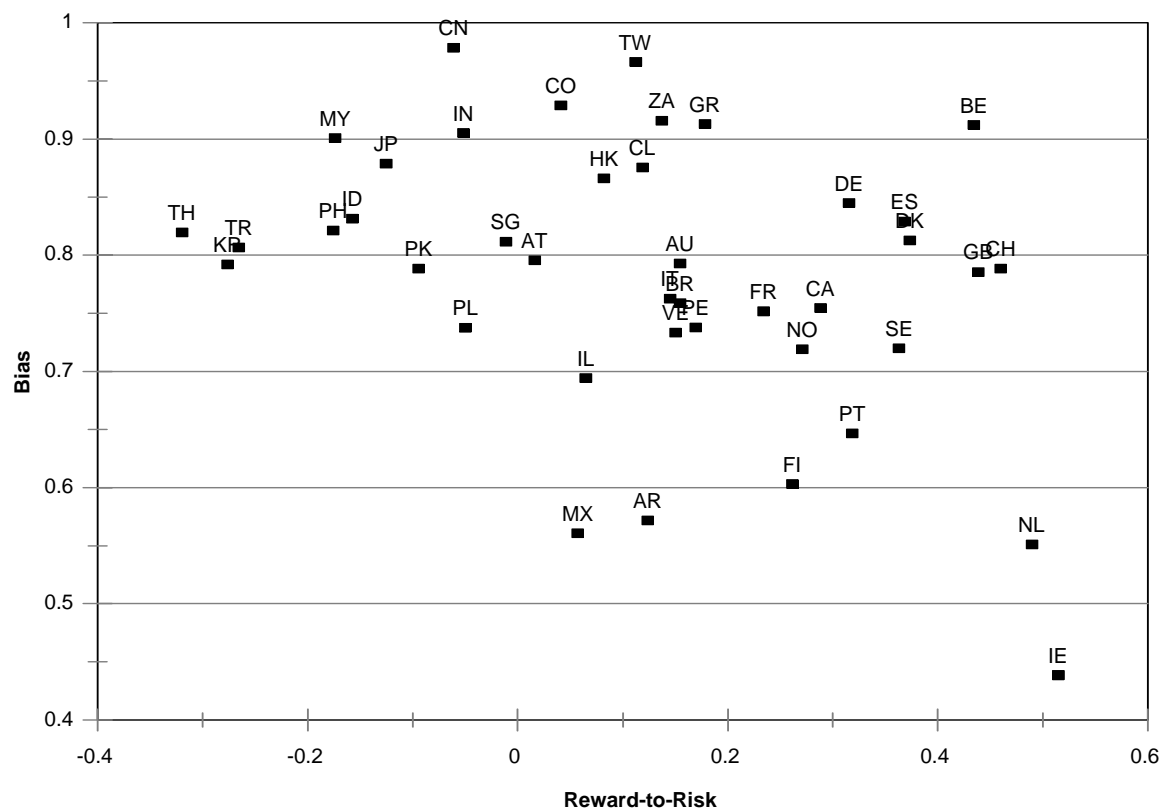
Notes: Data are for 1997. The reward-to-risk ratio is calculated using historical returns. See Figure 4 and Data Appendix A for country codes, sources, and other definitions.

Figure 9: Level I ADR Programs
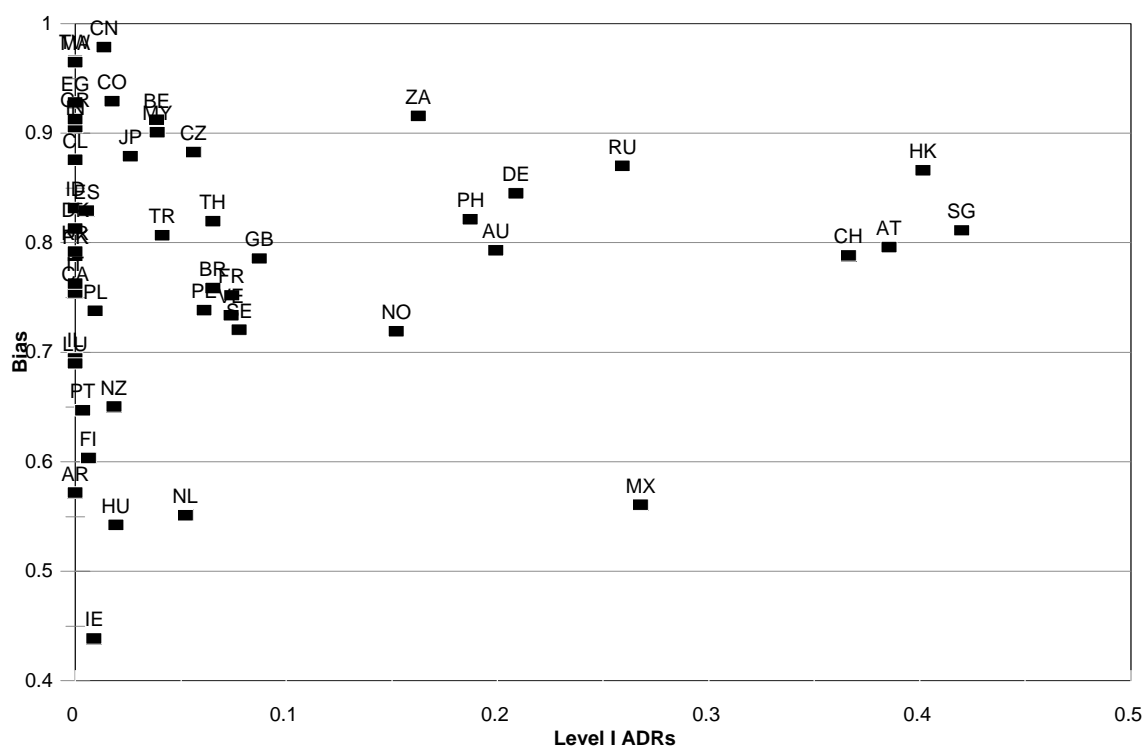
Notes: Data are for 1997. Level I ADRs is the portion of the foreign market that has a Level I ADR program. See Figure 4 and Data Appendix A for country codes, sources, and definitions.

Figure 10: Relative Transaction Costs
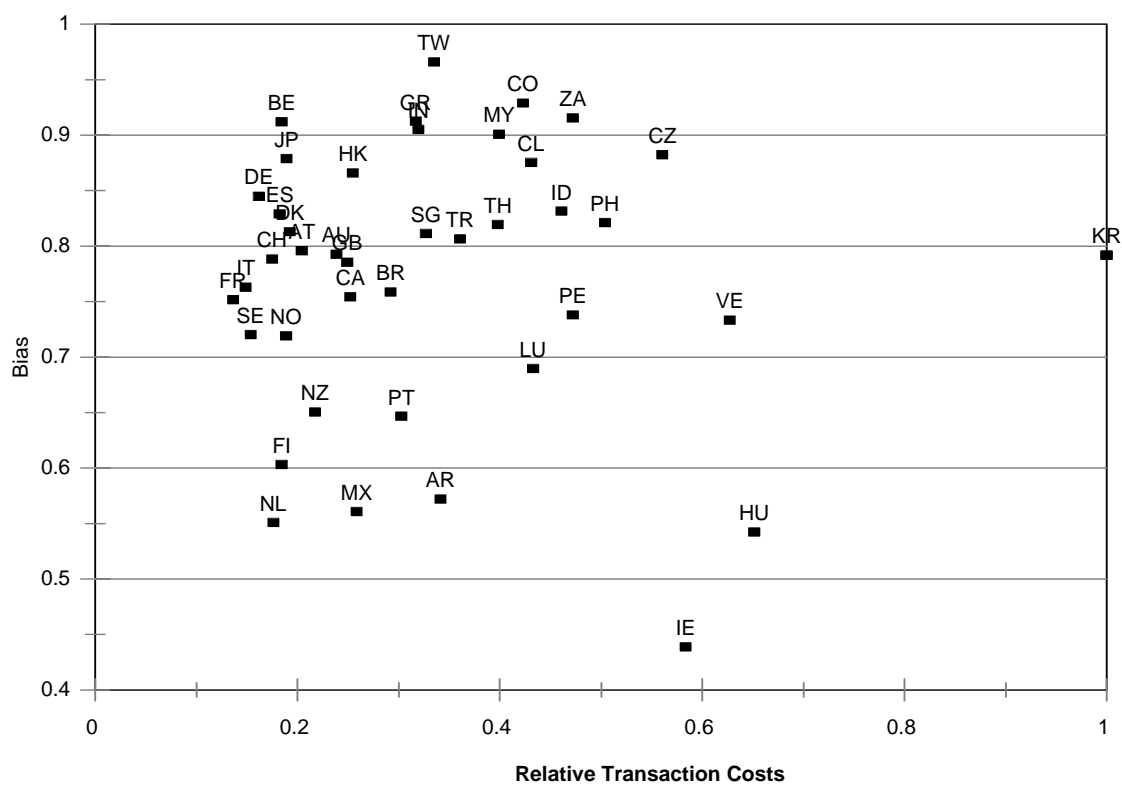
Notes: Data are for 1997. See Figure 4 and Data Appendix A for country codes, sources, and definitions.